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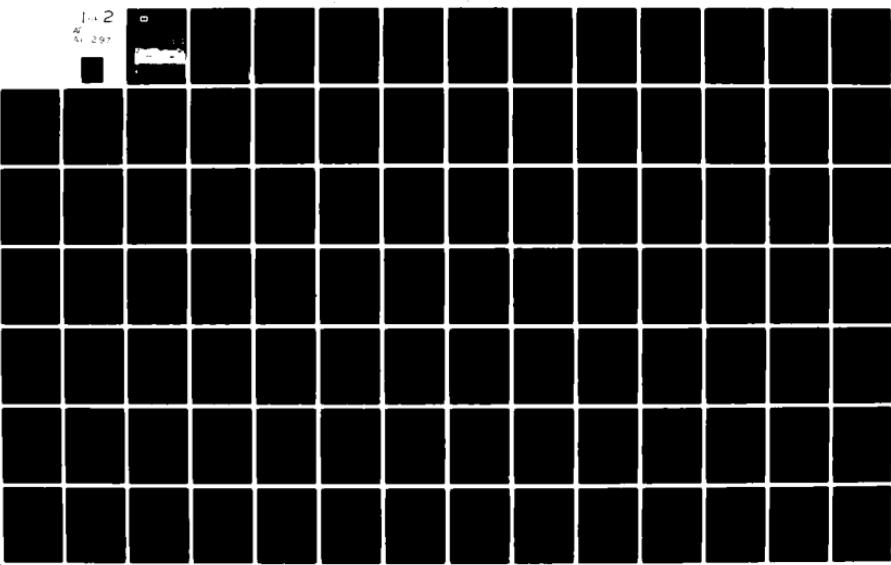
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ANIMAL SUBSTRATE RELATIONSHIPS AND PRODUCTIVITY OF INVERTEBRATE--ETC(U)
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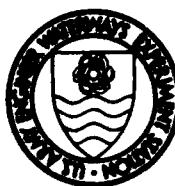


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**ANIMAL SUBSTRATE RELATIONSHIPS AND
PRODUCTIVITY OF INVERTEBRATE
MACROBENTHOS OF MISSISSIPPI SOUND AND
ADJACENT COASTAL AREAS; A BIBLIOGRAPHY
WITH ABSTRACTS**

by

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Environmental Laboratory

U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

December 1981

Final Report

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Mobile, Ala. 36628

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This document presents bibliographic material relevant to macrobenthic communities of the Mississippi Sound and adjacent areas. This bibliography is comprised of 140 references with abstracts or annotations and contains information on animal-substrate interaction and benthic invertebrate secondary production		

PREFACE

This document was prepared for the Mississippi Sound and Adjacent Areas Study conducted in part by the U. S. Army Engineer Waterways Experiment Station (WES) for the U. S. Army Engineer District, Mobile. WES activities in the project were authorized by Intra-Army Order for Reimbursable Services No. FC-81-0020 dated 25 November 1980.

This bibliographic document together with a companion bibliography comprise the preliminary products of an investigation to describe the ecological role of the invertebrate macrobenthos of the sound and adjacent coastal habitats. The results of this study will be used for planning, dredging, and dredged material disposal operations in Mobile District.

This document was prepared by Messrs. John D. Lunz and Harry L. Horstmann, Environmental Systems Division (ESD), Environmental Laboratory (EL), WES. Dr. Andrew C. Miller, ESD, assisted with computer software development. Work progressed under the general supervision of Dr. Thomas D. Wright, Chief, Waterways Habitat and Monitoring Group, ESD, EL; Mr. Bob O. Benn, Chief, ESD; and Dr. John Harrison, Chief, EL.

COL Tilford C. Creel, CE, was Commander and Director of WES during the conduct of this work. Technical Director was Mr. Fred R. Brown.

This report should be cited as follows:

Lunz, J. D., and Horstmann, H. L. 1981. "Animal Substrate Relationships and Productivity of Invertebrate Macrofauna of Mississippi Sound and Adjacent Coastal Areas; A Bibliography with Abstracts," Miscellaneous Paper EL-81-12, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

ANIMAL SUBSTRATE RELATIONSHIPS AND
PRODUCTIVITY OF INVERTEBRATE MACROBENTHOS
OF MISSISSIPPI SOUND AND ADJACENT COASTAL AREAS;
A BIBLIOGRAPHY WITH ABSTRACTS

1. This bibliography and a companion bibliography on the feeding habits of fishes of the Mississippi Sound and Mississippi-Alabama Gulf Coast are the preliminary products of a U. S. Army Engineer Waterways Experiment Station (WES) study analyzing the trophic support potential of macrobenthic infauna to demersal bottom-feeding fishes. The macrobenthic fauna, particularly the infauna, of the Mississippi and Alabama estuarine-marine complex have not been well described by the technical literature. For this reason, the bibliography contains many references to conditions outside the study areas but judged to be relevant to the analysis and interpretation of faunal data within these areas. One hundred and forty papers were selected for their methodological or conceptual information content. The majority deal with animal-substrate interactions or benthic invertebrate secondary production. Additional subjects include: (a) benthic community pattern classification, (b) the short- and long-term temporal dynamics of benthic faunal communities, (c) benthic pelagic coupling in terms of water quality and pelagic productivity, and (d) benthic responses to stress. Sublittoral soft-bottom habitats have been emphasized, but informative references to benthic faunal observations in hard-bottom habitats as well as both unvegetated and vegetated littoral habitats are also included.

2. Most citations are accompanied by the complete author abstracts. Where the length of the abstract exceeded the capacity of the computerized information handling and printing system used to produce this document, abstracts were truncated. This occurred with fewer than 10 percent of the abstracts. Papers which contained no abstracts were annotated.

3. Literature represented by these abstracts and annotations was compiled by the WES as part of its efforts to analyze infaunal predation by demersal fishes. This analysis perceives the predator-prey relationship in two ways. The first perceives the relationship as a function of

the morphological characteristics of bottom-feeding fishes that predispose them to exploit particular macrobenthos; the second concerns the characteristics of invertebrate organisms that influence their value as fish food. This particular bibliography also serves a broader purpose by assisting literature study by persons with responsibilities for analyzing and interpreting macrobenthic infaunal data and managing these benthic sources.

4. Other significant efforts contributing to the project analysis include a comprehensive benthic macrofaunal survey of the Mississippi Sound and Mississippi-Alabama Gulf Coast being conducted by Barry A. Vittor and Associates, Inc., Mobile, Ala., and a field and laboratory examination of the feeding morphologies and diets of selected demersal fish species by the WES.

5. The study will conclude during 1982 with a final report describing the trophic support potential of the areas different benthic communities to various benthic feeding fishes including: Urophycis floridanus, (Southern hake); Menticirrhus americanus, (Southern kingfish); Leiostomus xanthurus, (Spot); Urophycis regius, (Spotted hake); and Ariopsis felis, (Sea catfish).

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ALLER, R.C. AND R.E. DODGE
1974 NO. 34
ANIMAL-SEDIMENT RELATIONS IN A TROPICAL LAGOON DISCOVERY BAY,
JAMAICA
J MAR RES 32(2): 209-232.

THE DISTRIBUTION OF MANY MACROBENTHIC SPECIES IN THE BACK-REEF LAGOON OF DISCOVERY BAY, JAMAICA CAN BE RELATED TO A GRADIENT IN BOTTOM STABILITY. THIS GRADIENT IS DEFINED BY INCREASING RATES OF BIOGENIC REWORKING & SEDIMENT RESUSPENSION IN THE WESTERN PART OF THE LAGOON. INFANAL DIVERSITY & CORAL GROWTH DECREASE IN THE WESTERN UNSTABLE AREAS. THE INFANAL OF THE CARBONATE SAND CONSIST MAINLY OF DEPOSIT FEEDERS. IN THE WESTERN LAGOON, THE FEEDING ACTIVITIES OF THIS GROUP RESULT IN HIGH BIOGENIC REWORKING RATES (UP TO 6-7 CM/WEEK) PRODUCING LOOSE SURFACE SEDIMENT EASILY RESUSPENDED BY WAVES. A MAXIMUM, MEAN RESUSPENSION RATE OF 19 MG/CM/DAY WAS MEASURED. INSTABILITY OF THE LAGOON FLOOR, RESULTING IN HIGH WATER TURBIDITY, INHIBITS SETTLEMENT & GROWTH OF MOST SUSPENSION FEEDERS & REDUCES INFANAL DIVERSITY & CORAL GROWTH. BECAUSE STABILITY OF THE SOFT-BOTTOM IS SIGNIFICANTLY INFLUENCED BY DEPOSIT FEEDERS, OUR OBSERVATIONS REPRESENT AN EXTENSION OF THE TROPHIC GROUP AMENSALISM PRINCIPLE TO TROPICAL NEARSHORE ENVIRONMENTS.

ALLER, R.C. AND J.Y. YINGST
1978 NO. 02
BIOGEOCHEMISTRY OF TUBE DWELLINGS A STUDY OF THE SEDENTARY
POLYCHAETE AMPHITRITE ORNATA
J MAR RES 36(2): 201-254

MOST STUDIES OF NEAR INTERFACE PROPERTIES ASSUME THAT CHEMICALLY & BIOLOGICALLY SAMPLING PATTERNS REFLECT THIS ASSUMPTION & LITTLE ATTENTION HAS BEEN PAID TO THREE-DIMENSIONAL HETEROGENEITY IN THIS STUDY THE EFFECTS OF BURROW STRUCTURES FORMED BY AMPHITRITE ORNATA ON THE DISTRIBUTION OF PHYSICAL, CHEMICAL, & BIOLOGICAL CHARACTERISTICS OF A DEPOSIT ARE INVESTIGATED. A. ORNATA IS A SURFACE DEPOSIT-FEEDING TEREBELLID COMMON IN INTERTIDAL AREAS. IT CONSTRUCTS A PERMANENT, MULTI-LAYERED, U-SHAPED TUBE FROM PARTICLES OBTAINED AT THE INTERFACE. B. ORNATA TRANSPORTS PARTICLES DURING FEEDING AT A RATE OF APPROX. 4.5 G/D ($T=22^{\circ}\text{C}$) &, BASED ON LABORATORY STUDIES, IRRIGATES ITS TUBE AT 91 CC/HR ($T=22^{\circ}\text{C}$). FIELD MEASUREMENTS OF BURROW WATER PROPERTIES SHOW THAT IN THE ABSENCE OF IRRIGATION, BURROW WATER RAPIDLY INCREASES IN NH_4^+ , HPO_4^{2-} , Fe^{2+} , & POSSIBLY Mn^{2+} & ATP CONCENTRATIONS. THE BURROW WALL IS A SITE OF INTENSE DECOMPOSITION RELATIVE TO SURROUNDING SEDIMENT PORE WATER GRADIENTS AWAY FROM THE WALL SHOW A DECREASE IN ALKALINITY, NH_4^+ , Fe^{2+} , & Mn^{2+} & HIGHEST CONCENTRATIONS ARE FOUND IN THE BURROW WALL. ATP, MEIOFAUNAL ABUNDANCE & DHA (DEHYDROGENASE ACTIVITY) DETERMINATIONS SHOW THAT MICROBIAL POPULATIONS ARE HIGHEST IN THE INNERMOST BURROW WALL & THAT MUCH OF THE METABOLIC ACTIVITY IN THE OUTER WALL IS ANAEROBIC. THE THREE-DIMENSIONAL DISTRIBUTION OF SOLID PHASE SULFIDES, FES (ACID-VOLATILE) & FeS^{2+} , DEMONSTRATES HIGHER CONCENTRATIONS OF THESE COMPOUNDS & RATES OF SO_4^{2-} -REDUCTION IN THE BURROW WALL THAN IN SURROUNDING SEDIMENT. DIFFUSION-REACTION & STOICHIOMETRIC MODELS OF PORE WATER GRADIENTS AROUND THE BURROW INDICATE THAT SO_4^{2-} -REDUCTION RATES ARE APPROX. 80-250 MOLES/1/YR ($T=22^{\circ}\text{C}$) & THAT N/P & C/N RATIOS OF ORGANIC MATTER BROKEN DOWN IN THE WALL ARE LOW, INDICATIVE OF EARLY, RAPID DECOMPOSITION. AS A RESULT OF THE INTENSE DECOMPOSITION PROCESSES IN THE BURROW WALL, FE, MN, & ZN ARE MOBILIZED & THESE METALS ARE CONCENTRATED ALONG THE INNER BURROW-SURFACE. IRRIGATION WATER

ANSELL, A.D. ET AL.
1972. NO. 14
THE ECOLOGY OF TWO SANDY BEACHES IN SOUTHWEST INDIA: III.
OBSERVATIONS ON THE POP. OF DONAX INCARNATUS, D. SPICULUM
MAR BIOL 17: 318-332.

THE BIOLOGY OF TWO SPECIES OF DONAX, D. INCARNATUS GMELIN & D. SPICULUM REVEALED ON TWO BEACHES IN SOUTH WEST INDIA IS DESCRIBED. TWO YEAR GROUPS OF D. INCARNATUS WERE PRESENT ON BOTH BEACHES, FROM SETTLEMENTS DURING THE MONSOON PERIOD IN 1967 & 1968. AT SHERTALLAI, BOTH GROUPS WERE STUDIED THROUGH THE YEAR, & DATA ON GROWTH, MORTALITY & PRODUCTION ARE PRESENTED. AT COCHIN, THE RATE OF GROWTH WAS SLOWER & THE MAXIMUM SIZE ATTAINED SMALLER, BUT MORTALITY DURING THE EARLY MONSOON PRECLUDED STUDY OF D. INCARNATUS THROUGH A FULL YEAR. D. SPICULUM OCCURRED AT COCHIN MAINLY DURING THE PRE-MONSOON PERIOD, & AT SHERTALLAI DURING THE POST-MONSOON. THE SPECIES HAS A SHORTER LIFE-SPAN THAN D. INCARNATUS, BUT ITS IRREGULAR OCCURRENCE DID NOT ALLOW DETAILED PRODUCTION ESTIMATES.

ARNTZ, W.

1979. NO¹¹ PREDATION BY DEMERSAL FISH AND ITS IMPACT ON THE DYNAMICS OF MACROBENTHOS IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C.PRESS: 121-149

SINCE 1968, INVESTIGATIONS HAVE BEEN CARRIED OUT IN THE WESTERN BALTIMON INTER-RELATIONSHIPS OF THE DYNAMICS OF MACROBENTHOS & DEMERSAL FISH. THESE STUDIES HAVE INVOLVED: 1) INVESTIGATIONS OF OVER 5,000 STOMACH & GUT ANALYSES TO QUANTIFY THE FOOD (INCLUDING SEASONAL CHANGES) OF COD, WHITING, DAB, PLAICE, FLUNDER & SOME LESS IMPORTANT FISH SPECIES; 2) SURVEY OF INFAUNAL MACROBENTHOS OVER EIGHT YEARS (1968-1971 & 1975-1978); & 3) A THREE-YEAR EXPERIMENTAL STUDY ON DYNAMICS & PRODUCTION OF MACROBENTHOS AT THE "BENTHOSEGARTEN" STATION. THIS PAPER ALSO INCLUDES FISH DATA PUBLISHED ANNUALLY BY THE INTERNATIONAL COUNCIL FOR THE EXPLOITATION OF THE SEA & FROM OTHER STUDIES CARRIED OUT IN KIEL BAY. THE INTERACTION OF MACROBENTHOS & DEMERSAL FISH IS DISCUSSED, PARTICULARLY REGARDING THE EFFECTS OF SELECTIVE PREDATION ON DIFFERENCES IN PREDATION INTENSITY FROM YEAR TO YEAR, RESULTING IN REDUCED POPULATION LEVELS OF MACROBENTHOS, WERE OBSERVED, BUT THE LONG-TERM DYNAMICS OF THE MORE IMPORTANT BENTHIC SPECIES IN THE WESTERN BALTIC WERE SEEMINGLY NOT INFLUENCED BY THE YEAR-CLASS STRENGTH OF DEMERSAL FISH. LIKEWISE, THE YEAR-CLASS STRENGTH OF BENTHOS IN DIFFERENT YEARS DID NOT AFFECT THE SIZE & PRODUCTION OF THE DEMERSAL FISH STOCKS IN THE AREA. A NUMBER OF POSSIBLE REASONS FOR THIS APPARENT LACK OF CORRELATION ARE DISCUSSED.

BANSE, K.
1979. NO. 29
ON WEIGHT DEPENDENCE OF NET GROWTH EFFICIENCY AND SPECIFIC
RESPIRATION RATES AMONG FIELD POPULATIONS OF INVERTEBRATES
OECOLOGIA (BERL.). 38: 111-126.

ANNUAL NET GROWTH EFFICIENCY (NGE) IS APPROXIMATED HERE BY $100 \cdot PA / (PA + RA)$, PA & RA BEING THE ANNUAL PRODUCTION & RESPIRATION RATES OF POPULATIONS PER UNIT AREA. PUBLISHED NGE VALUES FOR 15 TEMPERATE INVERTEBRATE POPULATIONS RANGE FROM 13 TO 55% CONTRARY TO THE LITERATURE ON NGE AMONG SPECIES, THE DEPENDENCE OF NGE ON SPECIES SIZE (AS BODY WEIGHT AT THE ONSET OF SEXUAL MATURITY, WS) IS NOT YET DETERMINED ALTHOUGH THE RANGES OF PA & RA DIVIDED BY THE MEAN BIOMASS (B), APPROACH TWO ORDERS OF MAGNITUDE. THE RA/B RATES OF 13 OF THESE POPULATIONS DECLINE WITH A -0.35 POWER OF WS RATHER THAN THE -0.25 POWER OF COMPAREATIVE PHYSIOLOGY. A POSSIBLE REASON MAY BE A TREND TOWARDS LARGER SPECIMENS (RELATIVE TO WS OR FULL SIZE) IN POPULATIONS OF LARGER SPECIES. AMONG SPECIES, A SIGNIFICANT DEPENDENCE OF NGE ON WS (OR FULL SIZE) IS NOT DEMONSTRABLE FOR LABORATORY POPULATIONS OF UNICELLULAR ORGANISMS & FIELD POPULATIONS OF MAMMALS SO THAT THE COST PER UNIT OF PRODUCTION MIGHT GENERALLY BE INDEPENDENT OF THE RATE OF PRODUCTION BY THE POPULATION.

BARNES, R. S. K. ET AL NO. 41
1976. INTERTIDAL SANDS AND INTERSTITIAL FAUNA ASSOCIATED WITH DIFFERENT
STAGES OF SALT-MARSH DEVELOPMENT
ESTUARINE COASTAL MAR SCI 4: 497-511.

SOME PHYSICAL & BIOLOGICAL PROPERTIES OF SANDS ASSOCIATED WITH
DIFFERENT STAGES IN SALT-MARSH FORMATION ON SCOLT HEAD ISLAND
(NORFOLK, U.K.) WERE INVESTIGATED. THE TRENDS WHICH ONE MIGHT
EXPECT IN SUCH A SERIES FROM EXPOSED, WAVE-WASHED SAND TO
SHELTERED, CREEK-BED SEDIMENT WERE OBSERVED, ALTHOUGH IN A SOME
WHAT POORLY MARKED FORM, IN (A) ORGANIC CARBON IN THE SEDIMENT,
(B) COVERAGE OF SAND GRAINS BY 'STAINING MATTER' & ATTACHED
PHOTOSYNTHETIC ORGANISMS, & (C) INVOLVEMENT OF SILTS IN THE
SEDIMENT. PERMEABILITY RESULTS, HOWEVER, WERE EQUIVOCAL & DID NOT
FOLLOW THE EXPECTED TREND. THE ABUNDANCE & DIVERSITY OF CILIATE
PROTOZOANS WERE GREATEST AT THE MOST SHELTERED & ORGANICALLY-RICH
SITE, WHEREAS THE NEMATODE FAUNA WAS MOST DIVERSE AT A LESS
'MATURE' STATION. IN GENERAL, THE PHYSICAL PROPERTIES OF THE
VARIOUS STATIONS DIFFERED MUCH LESS THAN THE BIOLOGICAL ONES, &
NO CLEAR RELATIONSHIP BETWEEN THE TWO EMERGED.

BENKE, A. C.

1979. NO. 5 MODIFICATION OF THE HYNES METHOD FOR ESTIMATING SECONDARY PRODUCTION WITH PARTICULAR SIGNIFICANCE FOR MULTIVOLTINE POPNS.
LIMNOL OCEANOGR 24(1): 168-170.

THE ACCEPTED PROCEDURE FOR DETERMINING PRODUCTION OF MULTIVOLTINE INVERTEBRATES BY USE OF THE HYNES METHOD IS TO MULTIPLY THE HYNES VALUE BY THE NUMBER OF GENERATIONS PER YEAR FOR AQUATIC INSECTS, IF PUPAL, ADULT, OR EGG STAGES COMPRIZE A SIGNIFICANT PORTION OF TOTAL GENERATION TIME, THIS PROCEDURE WILL UNDERESTIMATE PRODUCTION FOR CRUSTACEANS, IF REPRODUCTION OCCURS BEFORE ATTAINING THE FINAL SIZE CLASS; THE PROCEDURE, USING GENERATION TIME, WILL OVERESTIMATE PRODUCTION; IT IS NECESSARY TO MULTIPLY THE HYNES VALUE BY $365/CPI$, WHERE CPI IS THE COHORT PRODUCTION INTERVAL (IN DAYS) FROM HATCHING TO THE ATTAINMENT OF THE LARGEST AQUATIC SIZE CLASS.

BLUEWEISS, L. ET AL
1978. NO¹⁷
RELATIONSHIPS BETWEEN BODY SIZE AND SOME LIFE HISTORY PARAMETERS
OECOLOGIA (BERL.) 37: 257-272.

SUMMARY. PATTERNS IN LIFE HISTORY PHENOMENA MAY BE DEMONSTRATED BY EXAMINING WIDE RANGES OF BODY WEIGHT. POSITIVE RELATIONSHIPS EXIST BETWEEN ADULT BODY SIZE & THE CLUTCH SIZE OF POIKILOTHERMS, LITTER WEIGHT, NEONATE WEIGHT, LIFE SPAN, MATURATION TIME &, FOR HOMEOTHERMS AT LEAST, BROOD OR GESTATION TIME. THE COMPLEX OF THESE FACTORS REDUCES R_{MAX} IN LARGER ANIMALS OR, IN MORE PHYSIOLOGICAL TERMS, R_{MAX} IS SET BY INDIVIDUAL GROWTH RATE. COMPARISON OF NEONATAL PRODUCTION WITH INGESTION & ASSIMILATION SUGGESTS THAT LARGER MAMMALS PUT PROPORTIONATELY LESS EFFORT INTO REPRODUCTION. DECLINING PARENTAL INVESTMENT & LONGER DEVELOPMENT TIMES WOULD RESULT IF NEONATAL WEIGHT IS SCALLED ALLOMETRICALLY TO ADULT WEIGHT & NEONATAL GROWTH RATE TO NEONATAL WEIGHT. BODY SIZE RELATIONS REPRESENT GENERAL ECOLOGICAL THEORIES & THEREFORE HOLD CONSIDERABLE PROMISE IN THE DEVELOPMENT OF PREDICTIVE ECOLOGY.

BOESCH, D.F.
1973; NO. 45
CLASSIFICATION AND COMMUNITY STRUCTURE OF MACROBENTHOS IN THE
HAMPTON ROADS AREA, VIRGINIA
MAR BIOL 21: 226-244.

BENTHIC MACROFAUNA WAS SAMPLED BY GRAB AT 16 STATIONS IN HAMPTON ROADS & THE ADJACENT ELIZABETH RIVER, VIRGINIA. US A SPECIES WERE TAKEN IN FEBRUARY, MAY & AUGUST. SAMPLING SITES & SPECIES WERE GROUPED BY A CLASSIFICATION STRATEGY WHICH BASICALLY CONSISTED OF THE CANBERRA METRIC DISSIMILARITY-MEASURE & FLEXIBLE & GROUP AVERAGE CLUSTERING FOLLOWING REALLOCATIONS. 8 SITES GROUPS & 16 SPECIES GROUPS INSTRUCTIVELY CLASSIFIED THE 47 SITES & 93 SPECIES CONSIDERED IN THE ANALYSIS. THE SITES WERE GROUPED INTO "ASSOCIATIONS" ON MUD, MUDDY-SAND & SAND-BOTTOMS, & THOSE IN THE ELIZABETH RIVER. SPECIES GROUPINGS DISTINGUISHED A FEW SPECIES MOST FREQUENT AT ELIZABETH RIVERED OR MUD & MUDDY-SAND SITES, LARGER TO NUMBERS OF SPECIES RESTRICTED TO MUDDY-SAND & SAND OR SOLELY TO SAND SITES, UBIQUITOUS SPECIES, EPIFAUNAL SPECIES WHICH WERE MICROHABITAT-RESTRICTED, & SEASONAL SPECIES. AN ANALYSIS OF NUMERICALLY DOMINANT SPECIES IN THE DIFFERENT ASSOCIATIONS INDICATED THE RELATIVE IMPORTANCE OF UBIQUITOUS SPECIES & SEASONALLY ABUNDANT SPECIES. COMMUNITY-STRUCTURE STATISTICS (SPECIES DIVERSITY, EVENNESS & SPATIAL PATTERNS) SHOWED DEFINITE SPATIAL & TEMPORAL PATTERNS. DIVERSITY WAS HIGH AT SAND & MUDDY-SAND SITES & LOW AT MUD & ELIZABETH RIVER SITES. THIS SPATIAL PATTERN WAS PREDOMINANTLY ONE OF SPECIES RICHNESS. AT ELIZABETH RIVER & MUD SITES, DIVERSITY INCREASED FROM FEBRUARY TO AUGUST BECAUSE OF INCREASED EVENNESS, WHILE AT SAND & MUDDY-SAND STATIONS DIVERSITY PEAKED IN MAY IN RESPONSE TO BOTH HIGH SPECIES RICHNESS & HIGH EVENNESS. THE APPLICABILITY OF "COMMUNITY CONCEPTS", THE CAUSES OF SUBSTRATE SPECIFICITY, SEASONALITY & SPECIES DIVERSITY, & THE EFFECTS OF POLLUTION ON COMMUNITY STRUCTURE ARE DISCUSSED.

DOESCH, D. F.
1977 NO. 20
A NEW LOOK AT THE ZONATION OF BENTHOS ALONG THE ESTUARINE GRADIENT
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS:245-280

THE ZONATION OF MACROBENTHOS ALONG A HOMOIOHALINE ESTUARINE ESTUARY GRADIENT IN THE CHESAPEAKE BAY & A SEASONALLY POIKIHALINE ESTUARY GRADIENT IN THE BRISBANE RIVER ESTUARY, AUSTRALIA, WAS INVESTIGATED BY ASSESSING THE FAUNAL ASSEMBLAGE SIMILARITY & PATTERNS OF SPECIES DISTRIBUTIONS. THE FAUNAL CHANGE ALONG THE HOMOIOHALINE GRADIENT IS GRADUAL & RELATIVELY UNIFORM, WITH ZONES OF ACCELERATED CHANGE BROADLY OCCURRING AROUND THE BOUNDARIES OF THE VENICE SYSTEM SALINITY ZONES. THE MORE ABRUPT CHANGES ALONG POIKIHALINE GRADIENTS IS GOVERNED BY LOW SALINITY CONDITIONS. THESE PATTERNS OF ESTUARINE ZONATION CAN BE EXPLAINED IN TERMS OF THE DISTRIBUTION & ABUNDANCE OF STENOHALINE MARINE, EURYHALINE MARINE, EURYHALINE OPPORTUNISTIC, ESTUARINE ENDOMIC & FRESHWATER SPECIES.

BOROWSKY, B.

1980. NO⁷³

REPRODUCTIVE PATTERNS OF THREE INTERTIDAL SALT-MARSH GAMMARIDEAN
AMPHIPODS

MAR BIOL 55: 327-334.

AMONG THREE SYMPATRIC SPECIES OF EPIBENTHIC AMPHIPODS FOUND
AT DIFFERENT TIDE MARKS AT JAMAICA BAY, NEW YORK (USA), THE
LENGTH OF TIME JUVENILES SPEND WITH THE MOTHER INCREASES & THE
NUMBER OF JUVENILES PER BROOD DECREASES AS TIDAL HEIGHT
INCREASES. EACH BROOD HAS TWO DEVELOPMENTAL PERIODS: (1) THE
EMBRYONIC PERIOD, FROM OVULATION TO HATCHING; (2) THE JUVENILE
PERIOD, FROM HATCHING TO EMERGENCE FROM THE MARSUPIUM GAMMARUS
PALUSTRIS, FOUND AT THE HIGH-TIDE MARK, HAS A MEAN JUVENILE
PERIOD OF 1.7 DAYS & A MEAN BROOD SIZE OF 12.4 OFFSPRING; G.
MUCRONATUS, FOUND AT MEAN-TIDE MARK, HAS A MEAN JUVENILE PERIOD
OF 0.8 DAYS & A MEAN BROOD SIZE OF 27.4 OFFSPRING; MELITA NITIDA,
FOUND AT LOW-TIDE MARK, HAS A MEAN JUVENILE PERIOD OF 0.5 DAYS
& A MEAN BROOD SIZE OF 30.0 OFFSPRING. FURTHER, THE RANGE OF DAYS
THAT A JUVENILE MAY EMERGE IS WIDEST FOR G. PALUSTRIS (0 TO 8 DAYS
AFTER HATCHING) & NARROWEST FOR M. NITIDA (0 TO 2 DAYS).

BROUSSEAU, D. J. NO. 93
1978 POPULATION DYNAMICS OF THE SOFT-SHELL CLAM *MYA ARENARIA*
MAR BIOL 50: 63-71.

A LIFE TABLE WAS CONSTRUCTED FOR *MYA ARENARIA* FROM GLOUCESTER, MASSACHUSETTS, USA, BASED ON SCHEDULES OF AGE-SPECIFIC FECUNDITY & MORTALITY DETERMINED UNDER NATURAL CONDITIONS. MORTALITY RATES DECREASE WITH SIZE & AGE IN THIS SPECIES, WITH THE PERIOD OF MAXIMUM MORTALITY OCCURRING DURING THE SUMMER MONTHS. MORTALITY RATES DURING THE FALL & WINTER WERE CONSIDERABLY LOWER, PERHAPS DUE TO THE INACTIVITY OF NATURAL PREDATORS. THE SURVIVORSHIP CURVE FOR *M. ARENARIA* APPROXIMATES THE TYPE 3 CURVE OF DEEVY (1947) WHEN MEAN LIFE EXPECTANCY IS LOW IN RECENTLY-SETTLED CLAMS, & REMAINS FAIRLY HIGH FOR MOST OF THE REMAINDER OF LIFE. THE INTRINSIC RATE OF NATURAL INCREASE (r_{MAX}) IS VERY HIGH: 4.74. THIS ENORMOUS RATE OF POTENTIAL INCREASE IS OFFSET BY HIGH RATES OF LARVAL MORTALITY IN THE PLANKTON. UNLIKE THE REPRODUCTIVE VALUES OF MOST ANIMALS STUDIED, THOSE IN *M. ARENARIA* PEAK LATE IN LIFE, WELL AFTER THE KNOWN AGE OF FIRST REPRODUCTION. THIS IS PROBABLY THE RESULT OF INCREASED FECUNDITY WITH AGE. THE IMPLICATIONS OF THIS WORK IN THE AREA OF RESOURCE MANAGEMENT ARE DISCUSSED.

BUCHANAN, J.B., P.F. KINGSTON, AND M. SHEADER
1974. NO. 4 LONG-TERM POPULATION TRENDS OF THE BENTHIC MACROFAUNA IN THE
OFFSHORE MUD OF THE NORTHUMBERLAND COAST
J MAR BIOL ASSO U K 54:785-795.

THE CHANGES IN THE NUMBER OF SPECIES, THE NUMBER OF INDIVIDUALS & THE PRODUCTION OF A BENTHIC MUD ASSOCIATION HAVE BEEN STUDIED FOR A 4-YEAR PERIOD. THE NUMBERS OF SPECIES & THE TOTAL ESTIMATED PRODUCTION APPEAR TO HAVE REMAINED SUBSTANTIALLY STABLE, BUT THE NUMBER OF INDIVIDUALS HAS MORE THAN DOUBLED OVER THE PERIOD. WHEN CONSIDERING THE HIGH RANKING PRODUCERS, IT IS CLEAR THAT NOT ALL OF THESE HAVE CONTRIBUTED TO THE GENERAL RISE IN NUMBERS OF INDIVIDUALS. TWO SPECIES, AMMOTRYPANE AULOGASTER & ABRA NITIDA HAVE SHOWN AN ABRUPT FALL IN POPULATION NUMBERS & BIOMASS AT THE BEGINNING OF THE INVESTIGATION IN 1971. THESE SPECIES FIGURED IMPORTANTLY IN THE PRODUCTION ESTIMATES WITH 20 & 6% RESPECTIVELY OF THE TOTAL PRODUCTION AFTER 1971, BOTH WERE EFFECTIVELY ELIMINATED FROM THE PRODUCTION OF THE ASSOCIATION. A SECOND GROUP OF SPECIES, FROM AMONG THE PRODUCTION DOMINANTS, RAPIDLY INCREASED IN NUMBERS, BIOMASS & PRODUCTION SO AS TO COMPENSATE ALMOST EXACTLY FOR THE PRODUCTION LOST BY THE ELIMINATION OF AMMOTRYPANE & ABRA. THESE SPECIES INCLUDED HETEROMASTUS FILIFORMIS, PRIONOSPID CIRRIFERA, PARONIS GRACILIS & GLYCERA ROUXI. A THIRD GROUP OF HIGH RANKING PRODUCERS SHOWED NO RESPONSE & REMAINED STABLE IN BOTH NUMBERS & BIOMASS FOR THE PERIOD OF THE INVESTIGATION. THESE INCLUDED CALOCARIS MACANDREAE, LUMBRINERIS FRAGILIS, SPIOPHANES KROYERI & CHAETOZONE SETOSA. THE TEMPORAL VARIATION IN THE NUMBER OF INDIVIDUALS HAS BEEN REFLECTED IN A CONSIDERABLE FLUCTUATION IN DIVERSITY MEASUREMENTS, DUE ALMOST ENTIRELY TO THE REDISTRIBUTION OF THE PROPORTIONS OF A NUMBER OF HIGH RANKING SPECIES.

BURKE, M.V. AND K.H. MANN
1974 NO. 20
PRODUCTIVITY AND PRODUCTION: BIOMASS RATIOS OF BIVALVE AND
GASTROPOD POPULATIONS IN AN EASTERN CANADIAN ESTUARY
J FISH RES BOARD CAN 31: 167-177.

IN A NARROW, SHALLOW ESTUARY ON THE EAST COAST OF CANADA, THE DOMINANT INTERTIDAL INVERTEBRATES WERE BIVALVE & GASTROPOD MOLLUSCS. ON A SAND FLAT MYA ARENARIA PRODUCED 1.6 G.M-2.YR-1 DRY FLESH WEIGHT WITH A PRODUCTION: BIOMASS RATIO OF 2:54. WHEREAS MACOMA BALTHICA PRODUCED 1.936 M-2.YR-1 WITH A P:B RATIO OF 1:53. ON A SPARTINA MARSH, LITTORINA SAXATILIS PRODUCED 3.25 G.M-2.YR-1 WITH A P:B RATIO OF 4:11. APPROXIMATE P:B RATIOS WERE APPLIED TO BIOMASS FIGURES FOR FOUR OTHER SPECIES TO GIVE THE FOLLOWING ESTIMATES OF PRODUCTIVITY: MYTILUS EDULUS IS ON ZOSTERA BEDS 19:7 G.M-2.DRY WEIGHT; M. EDULUS ON SPARTINA BEDS 3:5 G.M-2.YR-1; MELAMPUS LINEATUS 1:1; NASSARIUS OBSOLETUS 1:15 G.M-2.YR-1; MELAMPUS LINEATUS 1:1 G.M-2.YR-1; LACUNA VINCATOR 0.06 G.M-2.YR-1. A TOTAL PRODUCTION OF THE MOLLUSCS IN THE ESTUARY IS ESTIMATED AT 4.7% OF THE PRODUCTION OF SPARTINA & ZOSTERA (CALL MEASURED IN KCAL). IT IS POSTULATED THAT MOLLUSCS ARE THE CHIEF PRIMARY CONSUMERS IN THE INLET.

CAIN, T. D.

1975. NO. 57
REPRODUCTION AND RECRUITMENT OF THE BRACKISH WATER CLAM RANGIA
CUNEATA IN THE JAMES RIVER, VIRGINIA
FISH BULL 73(2): 412-430.

REPRODUCTION & RECRUITMENT OF THE BRACKISH WATER CLAM RANGIA CUNEATA WERE INVESTIGATED IN THE JAMES RIVER, VA., FROM FEBRUARY 1970 TO JANUARY 1972. HISTOLOGICAL EXAMINATIONS OF GONADS WERE MADE, NEWLY SET CLAMS WERE COLLECTED, & TEMPERATURE & SALINITY MEASUREMENTS WERE TAKEN FROM THREE POPULATIONS LIVING IN DIFFERENT SALINITY REGIMES. GAMETOGENESIS BEGAN IN APRIL & RIPE GONADS WERE FOUND FROM MAY TO LATE NOVEMBER WITH NO INACTIVE PERIOD. FROM OBSERVATIONS OF SET ABUNDANCE, TWO PERIODS OF SPawning WERE DETERMINED: ONE IN EARLY THROUGH MIDSUMMER, COINCIDING WITH THE BEGINNING OF SPawning AS DETERMINED FROM GONADAL EXAMINATIONS; & A SECOND & LONGER PERIOD IN LATE FALL & EARLY WINTER, WITH AN INCREASED PERCENTAGE OF PARTIALLY SPAWNED & SPENT CLAMS. GAMETOGENESIS CEASED IN DECEMBER THROUGH MARCH AS RESIDUAL GAMETES WERE CYTOLYZED. SEX WAS NOT DETECTED DURING THIS LAST PHASE. MORE FEMALES THAN MALES WERE FOUND IN THE UPSTREAM (LOWER SALINITY) POPULATIONS. TEMPERATURE WAS IMPORTANT IN INITIATING GAMETOGENESIS IN THE SPRING & MIDSUMMER. SPAWNING CORRELATED BEST WITH CHANGES IN SALINITY TO APPROXIMATELY 5% OVER ITS ESTUARINE RANGE. RANGIA HAS A CONTROLLING EFFECT ON RANGIA SPAWNING & RECRUITMENT SEASONAL REDUCTION IN INPUT OF FRESHWATER (INCREASED SEAWATER INTRUSION) IS NEEDED TO INDUCE SPAWNING & RECRUITMENT IN UPSTREAM POPULATIONS. BEST RECRUITMENT OCCURRED TO THE MIDDLE OF THE HABITAT RANGE WHICH HAS AN ANNUAL SALINITY CHANGE FROM FRESH TO 5%

CAMMEN, L.M.

1976 NO. 97
MACROINVERTEBRATE COLONIZATION OF SPARTINA MARSHES ARTIFICIALLY
ESTABLISHED ON DREDGE SPOIL
ESTUARINE COASTAL MAR SCI 4: 357-372

CORE SAMPLES WERE TAKEN FROM DREDGE SPOIL PLANTED WITH SPARTINA ALTERNIFLORA, SPOIL LEFT BARE & NEARBY NATURAL MARSH IN TWO LOCATIONS IN ORDER TO DETERMINE THE FACTORS INFLUENCING THE DEVELOPMENT OF THE SPOIL FAUNA & TO INVESTIGATE THE RELATIONSHIP OF THE SPOIL FAUNA WITH THE NATURAL MARSH FAUNA. BASED ON CALCULATION OF TOTAL NUMBERS, TOTAL BIOMASS, SAMPLE DIVERSITY & SPECIES RICHNESS, & FAUNAL AFFINITY BETWEEN PLOTS, THE DIFFERENCE IN ELEVATION BETWEEN THE BARE & PLANTED SPOIL PLOTS APPEARED TO BE THE MAJOR FACTOR DETERMINING THE DEGREE OF SIMILARITY IN THEIR FAUNA. FIVE FACTORS ARE SUGGESTED TO CONTROL THE DEVELOPMENT OF THE PLANTED SPOIL FAUNA: THE SIMILARITY OF THE SPOIL TO NATURAL MARSH IN ELEVATION & SEDIMENT PARTICLE SIZE, THE NATURAL SEDIMENTATION RATE IN THE AREA, THE PROXIMITY OF THE SPOIL TO NATURAL MARSH & THE RELATIVE MATURITY OF THE NATURAL MARSH FAUNAL COMMUNITY.

CHAMBERS, M.R. AND H. MILNE
NO. 63
LIFE CYCLE AND PRODUCTION OF NEREIS DIVERSICOLOR O.F. MULLER IN THE
ESTUARINE COASTAL MAR SCI 3: 133-144.

NEREIS DIVERSICOLOR IS AN IMPORTANT FOOD SPECIES FOR VERTEBRATE
PREDATORS IN THE ESTUARY, SCOTLAND. IT OCCURS FROM LOW WATER
TO HIGH WATER BUT THOSE IN THE LOWER HALF OF THE SHORE ARE MORE
NUMEROUS, HEAVIER FOR A GIVEN SIZE & REPRODUCE EARLIER IN THE
SEASON THAN ANIMALS IN THE TOP HALF OF THE SHORE. BETWEEN APRIL
1973 & MARCH 1974 THERE WERE TWO SPawning SEASONS - ONE FROM JUNE TO
AUGUST & A SECOND FROM JANUARY TO MARCH, WITH THE ANIMALS BREEDING
BETWEEN THE AGES OF ABOUT 18 & 24 MONTHS. THE MEAN ANNUAL BIOMASS
WAS 4.22 G OF DRY WT/M², ANNUAL PRODUCTION 12.78 G OF DRY WT/M² &
THE PRODUCTION : BIOMASS RATIO 3 : 1. ABOUT 40% OF THE TOTAL
PRODUCTION WAS IN THE FORM OF GAMETES, BUT IT IS NOT POSSIBLE TO
SAY HOW MUCH OF THE TOTAL PRODUCTION WAS UTILIZED BY PREDATORS.

CHRISTIE, N.D. NO. 35
1975 RELATIONSHIP BETWEEN TEXTURE, SPECIES RICHNESS AND
VOLUME OF SEDIMENT SAMPLED BY A GRAB
MAR BIOL 30: 89-96.

THIS PAPER DISCUSSES THE PROBLEMS INVOLVED IN OBTAINING GRAB SAMPLES FOR DIRECT COMPARISON OF THE RESPECTIVE BENTHIC FAUNA USING INFORMATION FROM A SURVEY CONDUCTED ACROSS THE SOUTH AFRICAN CONTINENTAL SHELF BELOW THE BENGUELA CURRENT. MANY FACTORS INFLUENCE THE DEPTH OF GRAB PENETRATION INTO THE SEDIMENT & HENCE THE GRAB SAMPLE VOLUME. ONE OF THE MOST IMPORTANT OF THESE FACTORS IS SEDIMENT TEXTURE WHILE THIS FACT HAS BEEN LONG RECOGNISED, MOST WORKERS HAVE ATTACHED LITTLE SIGNIFICANCE TO IT. IT IS SHOWN HERE THAT AN EXPONENTIAL RELATIONSHIP EXISTS BETWEEN THE GRAB SAMPLE VOLUME & SEDIMENT TEXTURE, UNTIL THE MINIMUM PERCENTAGE OF SILT PLUS CLAY THAT WILL GIVE A MAXIMUM GRAB SAMPLE VOLUME IS REACHED. THIS RELATIONSHIP ONLY EXTENDS TO A CERTAIN DEPTH, IN THIS CASE TO 280 M. THERE ARE MORE SPECIES PER UNIT NUMBER OF SPECIMENS ("SPECIES RICHNESS") IN ASSOCIATION WITH SAND OR MUDDY-SAND THAN WITH MUD. A LINEAR RELATIONSHIP IS GIVEN BETWEEN THE GRAB SAMPLE VOLUME & SPECIES RICHNESS BETWEEN THE DEPTHS OF 280 & 440 M, INCLUSIVE.

CLARKE, G. L.

NO. 2⁴
1946 DYNAMICS OF PRODUCTION IN A MARINE AREA
ECOL MONOGR 16(4): 322-335.

A CONSIDERATION OF THE PRODUCTIVITY OF A NATURAL AREA SHOULD INVOLVE THE CONCEPTS OF (1) STANDING CROP, (2) MATERIAL REMOVED, INCLUDING THE YIELD TO MAN & (3) THE PRODUCTION RATE. THE PRODUCTION RATE OF THE ORGANISMS AT DIFFERENT TROPHIC LEVELS SHOULD BE CONSIDERED SEPARATELY & DISTINCTION MADE BETWEEN GROSS PRODUCTION (ASSIMILATION), NET PRODUCTION (GROWTH), & NET INCREASE IN THE STANDING CROP PER UNIT TIME. DIAGRAMS ARE PRESENTED ILLUSTRATING THE INTERRELATIONSHIPS BETWEEN THE PROCESSES OF PRODUCTION, CONSUMPTION, & DECOMPOSITION AT THE VARIOUS LEVELS IN THE ECOLOGICAL COMPLEX. THE APPLICATION OF THE FOREGOING CONCEPTS TO A MARINE AREA IS ILLUSTRATED USING DATA FROM GEORGES BANK. THE NATURE OF THE FUNDAMENTAL FACTORS UNDERLYING THE PRODUCTIVITY OF THE BANK IS POINTED OUT WITH A CONSIDERATION OF THE QUANTITATIVE RELATIONSHIPS INSO FAR AS THE EXISTING MEASUREMENTS PERMIT. VALUES FOR THE STANDING CROP & FOR THE NET PRODUCTION OF THE PHYTOPLANKTON & THE ZOOPLANKTON ARE PRESENTED WITH A DISCUSSION OF THE CONTROLLING INFLUENCE OF THE REDUCTION OF LIGHT IN THE WATER & OF THE DISLOCATIONS DUE TO CURRENTS. VALUES FOR THE YIELD OF THE COMMERCIAL CATCH OF FISH FROM THE BANK ARE COMPARED WITH YIELDS OBTAINED FROM FRESH-WATER & TERRESTRIAL AREAS.

COOPER, W.E.
1965 NO. 38
DYNAMICS AND PRODUCTION OF A NATURAL POPULATION OF A FRESH WATER
AMPHIPOD, HYALELLA AZTECA
ECOL MONOGR 35(4): 377-394

THE PAPER IS A QUANTITATIVE STATEMENT ON THE DYNAMICS OF A
POPULATION OF THE FRESHWATER AMPHIPOD HYALELLA AZTECA IN A
MICHIGAN LAKE. THE PAPER PROVIDES INFORMATION ON RATES OF SIZE-
SPECIFIC MORTALITIES, PRODUCTIVITY AND TURNOVER RATE.

CRUMB, S.E. NO. 81
1977 MACROBENTHOS OF THE TIDAL DELAWARE RIVER BETWEEN TRENTON AND
BURLINGTON & TRENTON, NEW JERSEY
CHESAPEAKE SCI 18(3): 253-265.

A STUDY OF THE MACROBENTHOS OF THE TIDAL DELAWARE RIVER BETWEEN BURLINGTON & TRENTON, NEW JERSEY, INCLUDED MEASUREMENTS OF DENSITY & BIOMASS FOR COMMON SPECIES. TUBIFICIDAE (LIMNODRILUS) WERE DOMINANT, COMPRISING OVER 90% OF ALL ORGANISMS TAKEN IN THE 3-YEAR STUDY PERIOD. DENSITY SEEMED TO BE A FUNCTION OF WATER TEMPERATURE (<20-25 C, OPTIMAL) & WAS GREATEST IN LATE SPRING & EARLY SUMMER. OTHER COMMON SPECIES WERE LARVAL PROCLADIUS (SCULICIFORMIS (CHIRONOMIDAE) & CORBICULA MANILENSIS (ASIATIC CLAM). PROCLADIUS WAS MOST ABUNDANT IN LATE SUMMER JUST PRIOR TO & DURING EMERGENCE. THE ASIATIC CLAM WAS IN THE PROCESS OF COLONIZING THE AREA & GROWTH DATA HAVE BEEN CALCULATED. POTENTIAL RELATIONSHIPS BETWEEN NUMBERS & STANDING CROP OF THE COMMON ORGANISMS WITH SEDIMENT TYPE & SEASONAL CHANGES WERE EXPLORED.

DAUER, D.M. ET AL. NO. 82
1979 EFFECTS OF NON-POINT POLLUTION ON BENTHIC INVERTEBRATES IN THE
LYNNHAVEN RIVER SYSTEM
BULLETIN, VIRGINIA WATER RESOUR RES CTR: NO 117, BLACKSBURG, VA.

INCREASED URBANIZATION & NON-POINT SOURCES OF POLLUTION IN THE AREA OF VIRGINIA'S LYNNHAVEN RIVER COMPLEX HAVE SUBSTANTIALLY INCREASED THE NUTRIENT CONTENT OF THE ADJACENT WATERS, WITH POSSIBLE ENRICHMENT EFFECTS. THIS RESEARCH COLLECTED TWO TYPES OF DATA TO ASSESS THE BIOLOGICAL EFFECTS OF THESE NON-POINT DISCHARGES ON ESTUARINE MACROINVERTEBRATES IN THE WESTERN & EASTERN BRANCHES OF THE RIVER. FIRST, INDIVIDUAL OYSTERS IN THE LYNNHAVEN WERE MONITORED FOR GROWTH TO DETERMINE WHETHER NUTRIENT ENRICHMENT ENHANCED OR IMPEDED GROWTH IN AREAS OF DIFFERENT WATER QUALITY. IN ADDITION, 10 PERMANENT SITES LOCATED IN THE RIVER'S INTERTIDAL ZONE FROM THE INLET AT THE MOUTH TO THE HEADWATERS OF BOTH BRANCHES WERE USED TO SAMPLE BENTHIC INFANAL MACROINVERTEBRATE COMMUNITIES SUCH AS BIOLGICAL PARAMETERS AS SPECIES NUMBERS, COMMUNITY DENSITY, & COMMUNITY BIOMASS WERE STUDIED AT EACH SITE BY COLLECTING BIMONTHLY SAMPLES FROM AUGUST 1976 THROUGH JUNE 1977 AS A COMPARISON, BENTHIC INVERTEBRATE SAMPLES WERE COLLECTED FROM OLD PLANTATION CREEK IN VIRGINIA'S EASTERN SHORE. THESE DATA CLEARLY INDICATE THAT NO SIGNIFICANT DETERIORATION OF WATER QUALITY HAS OCCURRED IN THE STUDY AREAS OF THE LYNNHAVEN'S WESTERN & EASTERN BRANCHES. RESULTS OF THE RESEARCH SHOW THAT BENTHIC INFANAL MACROINVERTEBRATE COMMUNITIES OF THE LYNNHAVEN ARE DOMINATED BY A GROUP OF AQUATIC ANIMALS THAT ARE NATURALLY ADAPTED TO WITHSTAND ENVIRONMENTAL STRESSES. COMPARING THE SPATIAL & TEMPORAL DISTRIBUTION PATTERNS FOR EACH INDIVIDUAL SPECIES IN THE LYNNHAVEN'S BRANCHES WITH SAMPLES COLLECTED IN OLD PLANTATION CREEK INDICATES THAT THE AMOUNT OF STRESS PLACED UPON THE LYNNHAVEN'S ENVIRONMENT BY NON-POINT SOURCES OF POLLUTION PROBABLY HAS LITTLE OR NO INFLUENCE UPON THE NATURAL BENTHIC INVERTEBRATE POPULATIONS.

DAVIS, N. AND G.R. VANBLARICOM
1978. NO. 55
SPATIAL AND TEMPORAL HETEROGENEITY IN A SAND BOTTOM EPIFAUNAL
COMMUNITY OF INVERTEBRATES IN SHALLOW WATER
LIMNOL. OCEANOGR. 23(3): 417-427.

TEMPORAL & SPATIAL PATTERNS OF ABUNDANCE IN A COMMUNITY OF
EPIFAUNAL INVERTEBRATES ON THE SHALLOW SUBTIDAL SAND PLAIN AT LA
JOLLA, CALIFORNIA, WERE STUDIED FROM MARCH 1974 THROUGH SEPTEMBER
1975, IN SIMILAR WORK BY FAGER IN THE SAME LOCATION FROM 1957
TO 1963; DENSITIES OF THE PRINCIPAL SPECIES WERE REMARKABLY
NONVARIANT, BOTH IN TIME & SPACE. THE MORE RECENT WORK SHOWED BOTH
LONG & SHORT TERM FLUCTUATIONS IN THE ABUNDANCES OF MANY OF THESE
SPECIES AS WELL AS PHYSICAL & BIOLOGICAL SPATIAL HETEROGENEITY.
THESE DIFFERENCES FROM FAGER'S RESULTS AS WELL AS EVIDENCE OF
TEMPORAL FLUCTUATIONS IN POPULATIONS OF ABUNDANT SPECIES ON
PORTIONS OF THE SAND HABITAT ADJOINING THE PRIMARY STUDY AREAS
SUGGEST THAT THE SHALLOW SAND COMMUNITY LACKS LONG TERM NUMERICAL
STABILITY.

DAYTON, P. AND J. OLIVER
1980 NO 13

AN EVALUATION OF EXPERIMENTAL ANALYSES OF POPULATION AND
COMMUNITY PATTERNS IN BENTHIC MARINE ENVIRONMENTS
INTENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS: 93-120

A BASIC OBJECTIVE OF SCIENCE IS TO DESCRIBE & UNDERSTAND THE MECHANISMS BY WHICH VARIOUS NATURAL PATTERNS ARE PRODUCED & MAINTAINED. IN RECENT YEARS EXPERIMENTAL APPROACHES HAVE BEEN USED WITH VARYING DEGREES OF SUCCESS IN EFFORTS TO UNDERSTAND THE MECHANISTIC RELATIONSHIPS STRUCTURING ECOLOGICAL COMMUNITIES. THIS ESSAY: 1) AFFIRMS OUR CONVICTION THAT CRITICAL TESTING OF SPECIFIC HYPOTHESES IS A VITAL COMPONENT OF SCIENCE & THAT PROPERLY CONTROLLED EXPERIMENTS OFFER THE CLEANEST & MOST POWERFUL TESTS OF HYPOTHESES; & 2) DISCUSSES PROBLEMS THAT WE PERCEIVE TO EXIST WITH EXPERIMENTATION IN ECOLOGY. WE DISCUSS CURRENTLY ACTIVE PARADIGMS & DELINEATE PROBLEMS SUCH AS ARTIFACTS THAT OCCUR IN POPULAR EXPERIMENTAL DESIGNS, ALTERNATE HYPOTHESES THAT ARE COMMONLY IGNORED, & MISINTERPRETATIONS RESULTING FROM NOT PROPERLY APPRECIATING SCALE IN TIME & SPACE. PERHAPS THE MOST DIFFICULT PROBLEM IS THAT PRECONCEPTIONS TEND TO FLAVOR QUESTIONS, DETERMINE RESEARCH DESIGNS, & BIAS INTERPRETATION OF THE DATA. THE PRECONCEPTIONS COMMONLY RESULT IN AN EMPHASIS ON VERIFICATION RATHER THAN FALSIFICATION OF HYPOTHESES. A PROCESS WHEREBY COUNTER EXAMPLES ARE IGNORED, ALTERNATE HYPOTHESES BRUSHED ASIDE, & EXISTING PARADIGMS MANICURED. THE ESCAPE FROM THIS TRAP IS VIGOROUS CONFRONTING OF THE PRECONCEPTIONS & PARADIGMS.

DEXTER, D.M.

1978 NO. 80

THE INFRAUNA OF A SUBTIDAL, SANDY-BOTTOM COMMUNITY AT IMPERIAL,
CALIFORNIA

CALIF FISH GAME 64(4): 268-279.

THE INFRAUNA CHARACTERISTIC OF SHALLOW SUBTIDAL SAND BOTTOMS WAS
SURVEYED SEASONALLY DURING 1976 AT IMPERIAL BEACH, CALIFORNIA. A
TOTAL OF 5,916 INDIVIDUALS WAS COLLECTED & 131 SPECIES WERE
REPRESENTED. AMONG THE MOST IMPORTANT CONTRIBUTORS TO THE DENSITY
WERE THE AMPHIPODS, EOHAUSTORIUS WASHINGTONIANUS & PARAPHOXUS
EPISTOMUS, THE ISOPOD, ANCINUS GRANULATUS, THE GASTROPOD, OLIVELLA
BAETICA, & THE SAND DOLLAR, DENDRASTER EXCENTRICUS. COMPARISON OF
CURRENT COMMUNITY COMPOSITION WITH THAT OF A PREVIOUS STUDY
INDICATES CONSIDERABLE STABILITY OR PERSISTENCE OF THE FAUNA.

DORGES, J. NO 15
1977 MARINE MACROBENTHIC COMMUNITIES OF THE SAPELO ISLAND, GEORGIA
REGION
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 399-421

THE PRESENT STUDY DEALS WITH THE OCCURRENCE, DISTRIBUTION,
DIVERSITY, & ABUNDANCE OF MACROBENTHIC ORGANISMS OF
DIFFERENT MARINE COMMUNITIES AROUND SAPELO ISLAND, GEORGIA. THE
PAPER SUMMARIZES & COMPARES DATA COLLECTED SINCE 1969 ON SALT
MARSHESES, BEACHES, SHELF AREAS, ESTUARIES, SHOALS, TIDAL FLATS, &
POINT BARS.

ECKMAN, J. E.
NO. 54
1979. SMALL-SCALE PATTERNS AND PROCESSES IN A SOFT-SUBSTRATUM,
INTERTIDAL COMMUNITY
J MAR RES 37(3): 437-457.

EXPERIMENTAL MANIPULATIONS & DIRECT OBSERVATIONS WERE COMBINED TO STUDY SMALL-SCALE DISPERSION PATTERNS & THEIR CAUSES IN AN INTER TIDAL SAND-FLAT COMMUNITY NUMERICALLY DOMINATED BY SESSILE & SEDENTARY TUBE DWELLERS: INDIVIDUALS OF SEVERAL SPECIES EXHIBITED GREGARIOUSNESS AT SCALES AS SMALL AS ONE CENTIMETER. EXPERIMENTS IN WHICH NEEDLES WERE PLACED IN SEDIMENTS TO SIMULATE ANIMAL TUBES SUGGESTED THAT ORGANISMS ARE AFFECTED BY PATTERNS OF FLOW WHICH CHANGE OVER DISTANCES OF SEVERAL MILLIMETERS TO A CENTIMETER. AT MOST SAMPLING TIMES, IN A SINGLE TRANSECT OF CONTIGUOUS CORE SAMPLES TWO OR MORE SPECIES EXHIBITED A COMMON, LARGER-SCALE ($=10$ CM) PERIODICITY IN ABUNDANCES, WHICH COULD NOT BE ATTRIBUTED TO DIRECT BIOLOGICAL INTERACTIONS. AN ALTERNATIVE MECHANISM POSTERIORI: ORGANISMS MAY BE AFFECTED BY LOCALLY VARYING HYDRO DYNAMIC ENVIRONMENTS PRODUCED BY BED RIPPLES. THE RESULTING PERIODIC DISPERSION PATTERN APPARENTLY PERSISTS AFTER RIPPLES HAVE DISAPPEARED. THESE RESULTS SUGGEST POTENTIAL PROBLEMS WITH COMMONLY USED SAMPLE SIZES & MANIPULATIVE TECHNIQUES. SCALES OF ENVIRONMENTAL HETEROGENEITY RELEVANT TO AN INDIVIDUAL MAY BE TOO SMALL TO BE RESOLVED USING TRADITIONAL BENTHIC SAMPLING METHODS. STUDIES IN WHICH DATA ARE COLLECTED AT ARBITRARY SCALE HOMOGENIZE SPATIAL PATTERNS THAT REFLECT SMALL-SCALE INTERACTIONS, PROCESSES & RESPONSES, & COULD SERIOUSLY AFFECT BETWEEN-SAMPLE VARIABILITY, THEREBY LEADING TO SPURIOUS CONCLUSIONS REGARDING THE PATTERN & CONTROL OF COMMUNITY STRUCTURE.

EDWARDS, D.C. AND J.D. HUEBNER
1977 NO. 56
FEEDING AND GROWTH RATES OF POLINICES DUPLICATUS PREYING ON MYA
ARENARIA AT BARNSTABLE HARBOR, MASSACHUSETTS
ECOLOGY. 58: 1218-1236.

THE COMPLETE YEAR-ROUND FEEDING & GROWTH OF THE MARINE SNAIL POLINICES DUPLICATUS EATING THE CLAM MYA ARENARIA WERE DIRECTLY MONITORED UNDER FIELD CONDITIONS. THE MAJOR FACTORS AFFECTING FEEDING RATES WERE FOOD SUPPLY, TEMPERATURE, PREDATOR SIZE OR WEIGHT, & RECENT FEEDING EXPERIENCE. PROVIDED WITH EXCESS PREY OF DIFFERENT SIZES, POLINICES PROVIDED SIMILAR NUMBERS OF PREY PER TIME (X = 95.5 MYA PER SNAIL PER YR). FEEDING VARIED DIRECTLY WITH TEMPERATURE (X = 95.5 MYA PER SNAIL PER DAY IN THE WARMEST MONTHS, BUT CEASING (AT = 5C) FOR 4 MO IN WINTER. ENERGY EQUIVALENTS FOR POLINICES & SIZE-WEIGHT RELATIONS FOR MYA VARIED SEASONALLY. ONLY = 80% OF THE TISSUE WEIGHT OR ENERGY CONTENT OF A PREY WAS ACTUALLY INGESTED BECAUSE LARGER PREDATORS CONSISTENTLY ATE LARGER PREY. THEY INGESTED MORE (385 KILOJOULES/YR FOR A 4TH-YEAR SNAIL) THAN SMALLER, YOUNGER ONES (= 218 KJ/YR FOR 2ND-YEAR SNAILS). WITH A SPECIFIED FOOD SUPPLY, TEMPERATURE & PREDATOR WEIGHT TOGETHER ACCOUNTED FOR MOST OF THE VARIABILITY IN INGESTION RATES (MILLIGRAMS OR KILOJOULES) OF MYA BY EXPERIENCED PREDATORS. ON A YEAR-ROUND BASIS, INGESTION RATES OF POLINICES WERE ONLY = 1% OF THEIR OWN WEIGHT PER DAY. GROWTH RATES, UNLIKE FEEDING RATES, WERE CORRELATED MORE WITH A SNAIL'S AGE THAN ITS SIZE OR WEIGHT: 2ND-YEAR POLINICES GREW NEARLY 3-FOLD IN DIAMETER OR = 105 KJ/YR VS 1.2-FOLD OR = 63 KILOJOULES FOR A 4TH-YEAR SNAIL. GROWTH CEASED DURING THE 5 COLDEST MONTHS (< 10C). IT WAS ALSO REDUCED WHEN SNAILS COULD NOT INTERACT WITH MOLLUSCAN PREY, POLINICES FAILED TO GROW ON A MYA DIET. GROSS GROWTH EFFICIENCIES WERE HIGH (48%-16% FOR YEAR-CLASSES 2 TO 4). ENERGY FLOW THROUGH POLINICES WAS COMPARABLE TO OTHER MARINE INVERTEBRATE PREDATORS: ANNUAL INGESTION & PRODUCTION PER METRE WERE ESTIMATED AT UP TO 151 & 71 KILOJOULES, RESPECTIVELY.

EDWARDS, R.R.C. NO. 22
1973. PRODUCTION ECOLOGY OF TWO CARIBBEAN MARINE ECOSYSTEMS I. PHYSICAL
ENVIRONMENT AND FAUNA
ESTUARINE COASTAL MAR SCI 1: 303-318.

A QUANTITATIVE STUDY WAS MADE OF THE INVERTEBRATE MACROFAUNA & FISH FAUNA OF TWO SHALLOW WATER ECOSYSTEMS. ONE WAS IN AN INLET ON A CLEAN SAND BOTTOM (1) WHILE THE OTHER WAS ON A MUDDY BOTTOM (2) NEAR A DISCHARGE POINT FOR DOMESTIC EFFLUENT. THE LARGEST AVERAGE BIOMASS OF LITTORAL INFRAUNA OF 2.894 G/M² DRY FLESH WEIGHT WAS FOUND AT (2) WHILE THE LARGEST AVERAGE BIOMASS OF SUBLITTORAL INFRAUNA OF 5.839 G/M³ WAS FOUND AT (1). FISH BIOMASS WAS 5.068 G/M² AT (1) & 1.200 G/M² AT (2) SUGGESTING AN AVOIDANCE REACTION TO THE CONTAMINATED WATER AT THE LATTER LOCALITY. DIETS OF DEMERSAL FISH WERE PREDOMINANTLY BENTHIC INFRAUNA AT (1) & EPIFAUNA AT (2), THE LATTER BEING RELATED TO THE PRESENCE OF A PROLIFIC WEED FAUNA IN THE SUBLITTORAL.

EDWARDS, R.R.C. NO. 26
1973. PRODUCTION ECOLOGY OF TWO CARIBBEAN MARINE ECOSYSTEMS II.
METABOLISM AND ENERGY FLOW
ESTUARINE COASTAL MAR SCI 1: 319-333.

PRIMARY PRODUCTION & RESPIRATION OF TWO MARINE ECOSYSTEMS WERE STUDIED BY MEASURING CHANGES IN DISSOLVED OXYGEN LEVELS. IN ONE OF THE ECOSYSTEMS, ON A CLEAN SAND BOTTOM, ENERGY INPUT FROM BENTHIC PRIMARY PRODUCTION & PLANKTONIC SEDIMENTATION WAS FULLY UTILIZED BY THE BENTHIC COMMUNITIES, THE FORMER CONTRIBUTING 62% & THE LATTER 38% OF INPUT. IN THE OTHER ECOSYSTEM, WHICH RECEIVED DOMESTIC EFFLUENT FROM A CITY, TOTAL ENERGY INPUT TO THE BOTTOM WAS HIGHER DUE TO INCREASED SEDIMENTATION & PRODUCTION OF BENTHIC MACROALGAE. ABOUT HALF OF THE INPUT TO THIS SYSTEM WAS UTILIZED IN AEROBIC RESPIRATION, WHILE THE REMAINDER ENTERED THE ANAEROBIC SYSTEM WHERE DEPOSITION OCCURRED. GROWTH, RESPIRATION & TURNOVER RATES ARE DISCUSSED TOGETHER WITH ESTIMATES OF ECOLOGICAL EFFICIENCIES.

FEDRA, K., ET AL
1976 NO. 00
ON THE ECOLOGY OF A NORTH ADRIATIC BENTHIC COMMUNITY, DISTRIBUTION
STANDING CROP AND COMPOSITION OF THE MACROBENTHOS
MAR BIOL 38: 129-145

THE BOUNDARIES AS WELL AS THE MACRO-EPIBENTHIC BIOMASS DISTRIBUTION & COMPOSITION OF A NORTH ADRIATIC BENTHIC COMMUNITY, DOMINATED BY THE BRITTLE STAR *OPHIOTHRIX QUINQUEMACULATA* (D.C.H.), THE SPONGES *RENIERA SSP.* & THE ASCIDIANS *MICROCOSMUS SSP.* WERE DETERMINED BY TRANSECTS TOTALLING MORE THAN 80 KM (I.E., A RECORDED AREA OF APPROXIMATELY 150 000 M²) WERE TAKEN BY MEANS OF A COMBINED TV- & PHOTOCAMERA SLED. THE OBSERVATIONS-TV-RECORDINGS, & PHOTOS, TOGETHER WITH 392 DIVER-COLLECTED QUANTITATIVE SAMPLES, WERE EVALUATED. THE BIOMASS-VALUES WERE USED TO ESTABLISH ISOBENTHOS WITHIN THE COMMUNITY, THE MEAN BIOMASS, MEASURED AS WET WEIGHT, AMOUNTED TO 370 (+- 73) G/M² WITH MAXIMA OF MORE THAN 1000 G/M². 64% OF THE BIOMASS WAS DUE TO THE DESIGNATING GROUP *OPHIOTHRIX-RENIERA-MICROCOSMUS*, 87.5% WERE REPRESENTED BY FILTER- & SUSPENSION-FEEDING SPECIES ALONE. THE MEAN BIOMASS IN THE PERIPHERAL AREAS WAS EVALUATED AT 166 (+- 62) G/M². BIOMASS DISTRIBUTION & COMPOSITION IS EXAMINED, & THE ECOLOGICAL FUNCTION & MEANING OF THE OBSERVED PATTERNS IS DISCUSSED.

FENCHEL, T., L. H. KOFFED AND A. LAPPALAINEN
NO 49
1975 PARTICLE SIZE-SELECTION OF TWO DEPOSIT FEEDERS: THE AMPHIPOD
COROPHIUM VOLUTATOR AND THE PROSOBRANCH HYDROBIA ULVÆ
MAR BIOL 30: 119-128.

THE FEEDING BIOLOGY OF THE DEPOSIT-FEEDING AMPHIPOD COROPHIUM VOLUTATOR IS COMPARED TO THAT OF THE COEXISTING, DEPOSIT-FEEDING PROSOBRANCH HYDROBIA ULVÆ REGARDING INGESTION OF PARTICLES, BOTH FORMS SHOW SIZE SELECTION WHICH ALONE CAN EXPLAIN THEIR COEXISTENCE. PARTICLE SIZE-SELECTION ALSO EXPLAINS SOME QUALITATIVE DIFFERENCES IN THE COMPOSITION OF THE FOOD OF THE TWO FORMS; THUS, DIATOMS PLAY A RELATIVELY LARGER ROLE IN THE DIET OF H. ULVÆ THAN IN THE DIET OF C. VOLUTATOR, WHEREAS BACTERIA ARE PROBABLY RELATIVELY MORE IMPORTANT FOR THE LATTER. RESULTS OF EXPERIMENTS WITH FEEDING OF C-14 LABELLED MICROORGANISMS ARE IN ACCORDANCE WITH THE FINDINGS ON PARTICLE SIZE-DISTRIBUTION OF THE GUT CONTENTS, & SHOW THAT (1) C. VOLUTATOR CAN ONLY UTILIZE BACTERIA ABSORBED TO PARTICLES WITHIN THE SIZE RANGE 4 TO 63 CM (THIS IS WHY THE PRESENCE OF CLAY & SILT PARTICLES IN THE SEDIMENT ARE NECESSARY FOR EFFICIENT FEEDING OF THIS AMPHIPOD); (2) C. VOLUTATOR CAN UTILIZE BACTERIA SUSPENDED IN THE WATER PUMPED THROUGH ITS BURROW FOR RESPIRATION IF SILT & CLAY PARTICLES ARE PRESENT IN THE SEDIMENT. (3) H. ULVÆ CAN UTILIZE LARGE PARTICLES, & ALSO BROWSES ON SURFACES, & SOME EVIDENCE IS BROUGHT FORWARD THAT IT ALSO UTILIZES MUCUS FOR TRAPPING MICROORGANISMS. THE COEXISTENCE OF DEPOSIT-FEEDING ANIMALS IS DISCUSSED. IT IS CONCLUDED THAT THE NUMBER OF COEXISTING, CLOSELY RELATED SPECIES IS USUALLY SMALL, & THAT THEIR RESOURCE PARTITIONING IS PROBABLY MAINLY BASED ON PARTICLE-SIZE SELECTIVITY. IN THE CASE OF UNRELATED FORMS (E.G. H. ULVÆ & C. VOLUTATOR), A NUMBER OF BEHAVIOURAL, PHYSIOLOGICAL & MORPHOLOGICAL DIFFERENCES, & ALSO THE WIDESPREAD ABILITY OF DEPOSIT FEEDERS TO RESOURCE PARTITIONING, THUS, FEEDING MECHANISMS MAY ALSO LEAD TO RESOURCE PARTITIONING. THUS, THERE ARE OFTEN SEVERAL NICHE DIMENSIONS RELATED TO FEEDING ALLOWING A CERTAIN DIVERSITY OF COEXISTING DEPOSIT FEEDERS.

FRAME, A. B.
1980. NO. 71
TWO NEW SPECIES OF SAND BURROWING AMPHIPOD CRUSTACEANS FROM LONG
ISLAND SOUND AND THE N.Y. BIGHT.
ESTUARIES. 3(2): 75-83.

ACANTHOHAUSTORIUS BOUSFIELDI N. SP. & A. SIMILIS N. SP.
(AMPHIPODA: HAUSTORIIDAE) ARE DESCRIBED FROM THE OFFSHORE BOTTOM
SANDS OF THE NEW YORK BIGHT & LONG ISLAND SOUND REGIONS.

FRANKENBERG, D. AND A. LEIPER

NO. 17
1977

SEASONAL CYCLES IN BENTHIC COMMUNITIES OF THE GEORGIA CONTINENTAL SHELF

COULL, B.C. (ED). ECOL MAR BENTHO, UNIV S. CAROLINA PRESS: 383-397

A COMPARISON OF BENTHIC FAUNAL ASSEMBLAGES ON THE CONTINENTAL SHELF OFF GEORGIA IN 1964 & 1970 SHOWS THAT DENSITY OF BENTHIC POPULATIONS MAY FLUCTUATE GREATLY FROM SEASON TO SEASON, YEAR, & PLACE TO PLACE. THE DENSITY OF ANIMALS STUDIED OFTEN VARIED BY 1 OR MORE ORDERS OF MAGNITUDE WITHIN SHORT RANGES OF SPACE &/OR TIME; THE DENSITY OF A NUMERICALLY DOMINANT MEMBER OF THE NEARSHORE FINE SAND ASSEMBLAGE, *SPIOPHANES DOMBYX*, VARIED BY MORE THAN 4 ORDERS OF MAGNITUDE WITHIN THE COLLECTIONS REPORTED. THE IMPLICATIONS OF THIS VARIABILITY TO THE COMMUNITY CONCEPT, THE CONCEPT OF COMMUNITY STABILITY & THE UTILIZATION OF QUANTITATIVE BENTHIC INFORMATION IN POLLUTION IMPACT STUDIES ARE DISCUSSED.

GAGE, J. AND G. COGHILL

NO. 16
1977 STUDIES ON THE DISPERSION PATTERNS OF SCOTTISH SEA LOCH BENTHOS
FROM CONTIGUOUS CORE TRANSECTS
COULL, B.C. (ED.). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 319-337

MOTILE BENTHIC SPECIES CONTRIBUTED A DISPROPORTIONATE SHARE
OF OVERALL COMMUNITY CLUSTERING IN CONTIGUOUS CORE SAMPLES
TAKEN ALONG A LINE TRANSECT FROM TWO POSITIONS, MUD IN
AND SOFT MUD IN LOCH CERERAN AND ONE POSITION, SOFT MUD IN
LOCH ETIVE ON THE WEST COAST OF SCOTLAND. DISPERSION OF MOTILE
SPECIES CHIEFLY ACCOUNTED FOR CLUSTERING PEAKS OCCURRING AT
BLOCK SIZES CORRESPONDING TO LINEAR SCALES FROM ABOUT 1 TO
3.5M IN CERERAN MUDY AND 1.5M IN SCUBA AND ABUNDANT
OF THE BENTHOS WERE TAKEN BY MEANS OF SCUBA AND ABUNDANT
SPECIES THEREIN WERE ANALYZED BY GREIG-SMITH'S METHOD OF
BLOCK-SIZE ANALYSIS OF SPATIAL DISPERSION. CONFIDENCE LIMITS
INDICATIVE OF THE RANDOM EXPECTATION WERE GENERATED BY METHODS
INCLUDING A MONTE CARLO PROCEDURE EMPLOYING POISSON VARIATES
DERIVED FROM PSEUDO-RANDOM NUMBERS. INTENSITY AND PREDOMINATING
SCALE OF OVERALL COMMUNITY CLUSTERING AT DIFFERENT SAMPLING
POSITIONS WERE COMPARED AN THE BASIS OF MEAN DEVIATION FROM
THE UPPER POISSON BOUND.

GIERE, O.
1975. POPULATION STRUCTURE AND FOOD RELATIONS AND ECOLOGICAL ROLE OF MARINE OLIGOCHAETES WITH SPECIAL REFERENCE TO MEIOBENTHIC SPECIES
MAR BIOL 31: 139-156.

DATA ON ABUNDANCE, BIOMASS & BIOVOLUME DEMONSTRATE THE SIGNIFICANT ECOLOGICAL ROLE OF OLIGOCHAETES IN THE LITTORAL MARINE BENTHOS. THEIR NUMERICAL & PRODUCTIVE IMPORTANCE IS COMPARABLE TO THAT OF MANY OTHER COMMON MEIO- & MACROFAUNA GROUPS FROM VARIOUS LITTORAL AREAS. OLIGOCHAETES OFTEN EXHIBIT NUTRITIONAL SPECIALIZATION (E.G. BACTERIA OR DIATOMS ATTACHED TO THEIR SAND GRAINS) CONSEQUENTLY, FOOD SUPPLY CAN CONTROL THEIR POPULATION STRUCTURE & DISTRIBUTION. FEW OLIGOCHAETES ARE APPARENTLY CONSUMED BY PREDATORS. HENCE, ONLY A SMALL PORTION OF THEIR BIOMASS IS TRANSFERRED TO HIGHER TROPHIC LEVELS, WHILE THE MAIN PART IS DECOMPOSED DIRECTLY. MOST OLIGOCHAETES SEEM TO REPRESENT FINAL LINKS OF RATHER SHORT FOOD CHAINS: ECOLOGICALLY, MARINE OLIGOCHAETES ATTAIN MAJOR IMPORTANCE ONLY IN LITTORAL AREAS.

GLEMAREC, M. AND A. MENESGUEN
1979 NO. 12
FUNCTIONING OF A MUDDY SAND ECOSYSTEM: SEASONAL FLUC. OF DIFFERENT
TROPHIC LEVELS AND DIFFICULTIES ESTIM. PRODUC. DOM. MACROFAUNA
IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C.PRESS:49-68

IN TEMPERATE ENVIRONMENTS THERE ARE IMPORTANT SEASONAL FLUCTUATION
AT DIFFERENT TROPHIC LEVELS OF THE BENTHOS. THIS HAS BEEN STUDIED
IN A MUDDY-SAND COMMUNITY IN THE BAY OF CONCARNEAU (SOUTH BRITTANY). AFTER A SPRING MICROPHYTOBENTHIC MAXIMUM, DIFFICULT TO
ESTIMATE IN 1978 BECAUSE OF SEVERE CLIMATIC CONDITIONS, NEMATODES
APPEARED IN GREAT NUMBERS ONE MONTH LATER. THE SAME SITUATION
OCCURRED IN AUTUMN FOLLOWING A MAXIMUM OF PHAEOPHYTIN A & A PERIOD
OF OPTIMAL SEDIMENTARY STABILITY. INTERPRETATION OF TROPHIC
RELATIONSHIPS BETWEEN MICROPHYTOBENTHOS & MEIOBENTHOS IS DIFFICULT
THE MACROFAUNA BIOMASS OSCILLATED BETWEEN 10 & 30 G/M² DURING ONE
YEAR. IN ORDER TO ILLUSTRATE THE MACROBENTHIC VARIATIONS, THREE
POPULATIONS HAVE BEEN STUDIED IN DETAIL WITH THE HELP OF
AUTOMATIZED HISTOGRAM ANALYSIS: ABRA ALBA (BIVALVIA), AMPELISCA
SPINIPES (AMPHIPODA) & AMPHIURA FILIFORMIS (AMPHIURIID). TWO
DIFFERENT DEMOGRAPHIC STRATEGIES APPEARED THAT CORRESPOND TO
DIFFERENT BEHAVIOR DURING SETTLEMENT IN A NEW AREA. THE EVOLUTION
OF THE SUCCESSIVE COHORTS MAY BE VERY DIFFERENT FROM YEAR TO YEAR.
FLUCTUATIONS IN THE DENSITIES OF AMPHIURA FILIFORMIS STUDIED OVER
SEVEN YEARS SHOW THAT CHANGES IN RECRUITMENT ARE DIFFICULT TO LINK
WITH ANY ABIOTIC FACTOR, BUT THAT INTRASPECIFIC COMPETITION
EXISTS. THIS APPROACH EMPHASIZES THE DIFFICULTIES IN ESTIMATING
SECONDARY PRODUCTION. PRODUCTION ESTIMATES ARE MADE FOR THE THREE
SPECIES.

1977 NO. 01
SULFATE REDUCTION, DIFFUSION, AND BIOTURBATION IN LONG ISLAND SOUND
SEDIMENTS REPORT OF THE FOAM GROUP
AM J SCI 277: 193-237

SEDIMENT GRAVITY & BOX CORES WERE TAKEN OVER THE COURSE OF A 10-MONTH PERIOD AT A SINGLE STATION IN LONG ISLAND SOUND. A RANGE OF PORE WATER & SOLID PHASE CONSTITUENTS WERE MEASURED. SUMMER PORE WATER PROFILES EXHIBIT AN UPPER ZONE FROM 1 TO 8 CM IN WHICH CONCENTRATIONS OF CONSTYTUTENTS, SUCH AS SULFATE & ALKALINITY, DO NOT CHANGE MARKEDLY, HOWEVER, ARE SIGNIFICANTLY ALTERED FROM BOTTOM WATER VALUES WITH THE TRANSITION BETWEEN BOTTOM WATER & PORE WATER OCCURRING WITHIN THE TOP 1 TO 2 CM. THE UPPER 8 CM ZONE IS UNDERLAIN BY A MUCH THICKER ONE IN WHICH PORE WATER PROFILES SHOW TRENDS INDICATIVE OF PROGRESSIVE DIAGENESIS INVOLVING BACTERIAL SULFATE REDUCTION (FOR EXAMPLE, SULFATE DECREASE). WINTER PORE WATER CONCENTRATION AS AN UPPER ZONE OF CONSTANT PORE WATER DATA, DIRECT MEASUREMENT ALIQUOTS UNDER PRETING THE PORE WATER RATES BY INCUBATING SEDIMENT ALIQUOTS UNDER ANAEROBIC CONDITIONS & FOLLOWING SULFATE DEPLETION WITH TIME. THESE RATES FALL IN THE RANGE 2 TO 77 MM SULFATE/1 PORE WATER/YR & SHOW A STRIKING DECREASE WITH DEPTH IN THE SEDIMENT COLUMN.

IT IS ARGUED THAT THE DEPTH INDEPENDENT PORE WATER PROFILES OR PARTICLE MIXING OF SEDIMENT BY MACROINFANAL ORGANISMS (THAT IS, BIOTURBATION) RATHER THAN BY LACK OF SULFATE REDUCTION. THIS CONCLUSION IS BASED ON HIGH MEASURED RATES OF SULFATE REDUCTION IN THE UPPER 8 CM. FREQUENT RECOVERY DURING CORING OF THE DEPOSIT-FEEDING POLYCHAETE WORM NEPTYS INCISA & PRESENCE OF ABUNDANT IRON-SULFIDE MINERALS IN THE UPPER 8 CM ALSO SUPPORT THIS CONCLUSION. THE VERTICAL TRANSPORT OF PORE WATER CONSTITUENTS ARISING FROM BIOTURBATION DURING THE SUMMER IS AT LEAST FIVE TIMES MORE RAPID THAN BY IONIC DIFFUSION. SUCH TRANSPORT DOES NOT SWAMP OUT ALL EFFECTS OF BACTERIAL METABOLISM AS THE LATTER PROCESS IS SO RAPID IN THE UPPER 1 CM AS TO MODIFY THE CHEMISTRY OF SOLUTIONS PASSING THROUGH THIS INTERVAL; DURING WINTER THE BIOTURBATING ACTIVITY OF INFANIA DECREASES; HENCE PORE WATER

GRASSLE, J. F. AND J. P. GRASSLE
NO. 79
OPPORTUNISTIC LIFE HISTORIES AND GENETIC SYSTEMS IN MARINE BENTHIC
POLYCHAETES J MAR RES 32(2): 253-284.

THE DECLINE IN BENTHIC MARINE FAUNA FOLLOWING AN OIL SPILL IN WEST FALMOUTH MASSACHUSETTS PERMITTED US TO FOLLOW THE RESPONSES OF A NUMBER OF POLYCHAETES & OTHER INVERTEBRATE SPECIES TO AN ENVIRONMENTAL DISTURBANCE. SPECIES WITHIN THE TWO STATIONS WITH THE GREATEST DIVERSITY & DECREASED AT THE TWO STATIONS WITH THE GREATEST REDUCTION IN DIVERSITY SHOWED INCREASES & DECLINES OF SOMEWHAT LESS OPPORTUNISTIC SPECIES. SELECTROPHORETIC STUDIES OF THE MOST OPPORTUNISTIC SPECIES, THE MOST OPPORTUNISTIC LOCUS OF THE DEHYDROGENASE CAPITATA, INDICATED SHORT-TERM SELECTION FOR A SINGLE GENOTYPE IN THE LARGE POPULATIONS PRESENT IN WILD HARBOR FOLLOWING THE OIL SPILL. THE LIFE HISTORIES OF THE MOST OPPORTUNISTIC SPECIES ARE SUMMARIZED. INITIALLY, RESPONSE TO DISTURBED CONDITIONS, ABILITY TO INCREASE RAPIDLY, LARGE POPULATION SIZE, MORTALITY, & HIGH MORTALITY ARE ALL FEATURES OF OPPORTUNISTIC SPECIES USING THESE CRITERIA. THE SPECIES ARE RANKED IN ORDER OF DECREASING DEGREE OF OPPORTUNISM AS: 1. *CAPITELLA CAPITATA*,² *POLYDORALIGNI*,³ *SYLLIDES VERRILLI*,⁴ *MICROPHTHALMUS ABERRANS*,⁵ *STREBLOPSIS BENEDICTI*,⁶ *MEDiomastus ambiseta*. WE PROPOSE USING MORTALITY AS THE BEST SINGLE MEASURE OF DEGREE OF OPPORTUNISM. A DEFINITION BASED ON MORTALITY EMPHASIZES THE PORTION OF THE LIFE CYCLE INVOLVED IN ADAPTATION THROUGH SHORT TERM SELECTION. TWO TYPES OF MARINE BENTHIC OPPORTUNISTS ARE DESCRIBED: 1. A MIXED STRATEGY VARIETY WITH OBLIGATE PLANKTONIC DISPERSAL WHERE SELECTION WITHIN LOCAL SUBPOPULATIONS OCCURS IN A SINGLE GENERATION; 2. A RESPONSE-TO-SELECTION TYPE WITH DIRECT DEVELOPMENT OR SETTLEMENT SHORTLY AFTER RELEASE FROM BROOD STRUCTURES ALLOWING SELECTION WITHIN LOCAL POPULATIONS THROUGH MORE THAN ONE GENERATION.

GRUSSENDORF, M. J. NO. 1²
0000.
USING AVERAGE AND MAXIMUM ANNUAL BIOMASS TO ESTIMATE SECONDARY
PRODUCT IN SHALLOW MARINE ZOOBENTHIC INVERTEBRATE POPULATIONS
INST. OCEAN., OLD DOMINION UNIVERSITY, NORFOLK, VIRGINIA, 16.PP.

A LITERATURE REVIEW WAS CONDUCTED TO ACQUIRE VALUES OF SECONDARY
PRODUCT, AVERAGE ANNUAL BIOMASS, & MAXIMUM ANNUAL BIOMASS IN
SHALLOW MARINE ZOOBENTHIC INVERTEBRATES. CORRELATION ANALYSIS,
BOTH PARAMETRIC & NONPARAMETRIC, PRODUCED A VERY HIGHLY SIGNI-
FICANT POSITIVE RELATIONSHIP BETWEEN SECONDARY PRODUCTION & ANNUAL
BIOMASS (AVERAGE & MAXIMUM). THROUGH LINEAR REGRESSION ANALYSIS,
TWO EQUATIONS WERE FORMULATED TO ALLOW THE ESTIMATE OF SECONDARY
PRODUCT IF EITHER FORM OF BIOMASS (AVERAGE OR MAXIMUM)
KNOWN. EFFICIENT USE OF AVERAGE OR MAXIMUM ANNUAL BIOMASS AS
ESTIMATORS DEPENDS ON FINANCIAL RESOURCES, FIELD RESEARCH TIME, &
THE QUANTITY & QUALITY OF A PRIORI KNOWLEDGE AVAILABLE ON THE
SPECIES POPULATION DYNAMICS.

HAMILTON, A. L. NO. 28
000 ON ESTIMATING ANNUAL PRODUCTION
ON ESTIMATING ANNUAL PRODUCTION
LIMNOL OCEANOGR: 771-781.

THE METHOD OF HYNES & COLEMAN IS MODIFIED TO MAKE IT MORE ADAPTABLE & MORE CONSISTENT WITH THEIR UNDERLYING ASSUMPTIONS. IF MOST ORGANISMS COMPRISING A COMMUNITY ARE UNIVOLANTINE & HAVE APPROXIMATELY THE SAME MAXIMUM SIZE, THE AVERAGE STANDING CROP CAN BE USED TO OBTAIN A REALISTIC ESTIMATE OF ANNUAL PRODUCTION. THE SIZE FREQUENCY DISTRIBUTION CAN BE REGARDED AS A FIRST ESTIMATE OF AN "AVERAGE COHORT" WHEN THE NUMBER OF "AVERAGE COHORTS" EQUALS THE NUMBER OF SIZE CLASSES THROUGH WHICH THE ORGANISMS GROW. IF GROWTH IN TERMS OF THE SIZES USED IS ASSUMED TO BE LINEAR, THEN NUMERICAL DIFFERENCES IN ADJACENT SIZE CLASSES CAN BE ATTRIBUTED TO MORTALITY WHEN ALL SIZE CLASSES ARE CONSIDERED TOGETHER. THE EFFECT OF NONLINEAR GROWTH ON THE ESTIMATE OF ANNUAL PRODUCTION IS NOT LARGE IN CONTRAST, A SERIOUS ERROR IS INTRODUCED IF THE ORGANISMS ARE NOT UNIVOLANTINE. WHEN THE GROWTH PATTERN & GENERATION TIME ARE KNOWN, IT IS RELATIVELY SIMPLE TO MODIFY THE AVERAGE SIZE FREQUENCY DISTRIBUTION TO IMPROVE THE ESTIMATE OF THE "AVERAGE COHORT" & HENCE IMPROVE THE ESTIMATE OF ANNUAL PRODUCTION. A REPLY TO THE CRITICISMS OF FAGER IS INCLUDED.

HAMILTON, P. V.
1978 NO. 92
INTERTIDAL DISTRIBUTION AND LONG TERM MOVEMENT OF LITTORINA
IRRORATA

MAR BIOL 46: 49-58

THE DISTRIBUTION OF LITTORINA IRRORATA SAY ON A LOW-ENERGY BARRIER BEACH ON THE NORTHERN GULF OF MEXICO IS DESCRIBED, & CORRELATED WITH THE PRESENCE OF SPARTINA ALTERNIFLORA & OTHER PLANTS IN THE UPPER INTERTIDAL ZONE. THE MOVEMENTS OF 66 INDIVIDUALLY TAGGED SNAILS WERE FOLLOWED IN THE S. ALTERNIFLORA ZONE FOR AN AVERAGE OF 226 DAYS, DURING WHICH TIME AN AVERAGE OF 10.6 POSITIONS WERE RECORDED PER SNAIL. THE SNAILS TRAVELED AN AVERAGE TOTAL PATH DISTANCE OF AT LEAST 995 CM, BUT DUE TO CONTORTED PATHS, ENDED UP AN AVERAGE RESULTANT DISTANCE OF ONLY 399 CM AWAY FROM THEIR ORIGINAL POSITIONS. THEY MOVED AN ESTIMATED RESULTANT DISTANCE OF APPROXIMATELY 20 TO 25 CM PER ACTIVITY PERIOD. DESPITE A SLIGHT OFFSHORE MOVEMENT DURING THE FALL & WINTER, THE SNAILS MOVED MORE PARALLEL TO THE SHORELINE THAN PERPENDICULAR TO IT.

HECK, K. L. JR.

NO. 87
COMPARATIVE SPECIES RICHNESS, COMPOSITION, AND ABUNDANCE OF
INVERTEBRATES IN CARIBBEAN SEAGRASS MEADOWS

MAR BIOL 41: 335-348

THE RESULTS OF A YEAR-LONG STUDY IN WHICH EPIBENTHIC INVERTEBRATES WERE COLLECTED MONTHLY FROM SEAGRASS (THALASSIA TESTUDINUM) MEADOWS ALONG THE CARIBBEAN COAST OF PANAMA & THE PANAMA CANAL ZONE ARE DESCRIBED IN THIS PAPER. DIFFERENCES IN SPECIES COMPOSITION & ABUNDANCE AMONG SITES WERE PRIMARILY DUE TO THE PROXIMITY OF SURROUNDING HABITATS, ESPECIALLY CORAL REEFS, WHICH CONTRAIN A NUMBER OF SPECIES THAT UTILIZE THE SEAGRASS MEADOWS. IN CONTRAST TO MANY PREVIOUS CHARACTERIZATIONS OF TROPICAL MARINE HABITATS, IMPORTANT SEASONAL FLUCTUATIONS IN BOTH SPECIES NUMBER & ABUNDANCE TOOK PLACE AT EACH OF THE SITES. DATA ON BREEDING ACTIVITY AMONG SEVERAL SPECIES OF DECAPOD CRUSTACEANS INDICATE YEAR-ROUND SEASONAL DIFFERENCES OCCUR IN THE PERCENTAGE OF OVIGEROUS FEMALES. THESE INTERSPECIFIC DIFFERENCES IN OBSERVED REPRODUCTIVE OUTPUT MAY BE EXPLAINED BY DIFFERENCES IN LIFE-CYCLE LENGTH, A FACTOR NOT OFTEN CONSIDERED IN DISCUSSIONS OF SEASONAL BREEDING PATTERNS IN TROPICAL MARINE INVERTEBRATES. OVERALL SPECIES COMPOSITION WAS QUALITATIVELY SIMILAR TO THAT REPORTED IN COMPARABLE STUDIES OF TROPICAL & SUBTROPICAL SEAGRASS MEADOWS ELSEWHERE, ALTHOUGH CARIDEAN SHRIMP & XANTHID CRAB SPECIES WERE REDUCED IN NUMBER & TOTAL ABUNDANCE WERE MUCH LOWER THAN IN PREVIOUS STUDIES.

HIBBERT, C. J. NO 33
1976 BIOMASS AND PRODUCTION OF A BIVALVE COMMUNITY ON AN INTERTIDAL
MUD-FLAT
J EXP MAR BIOL ECOL 25: 249-261.

SURVEYS OF AN INTERTIDAL MUDFLAT IN SOUTHAMPTON WATER IN TWO
SUCCESSIVE WINTERS (1972 & 1973) YIELDED A TOTAL OF 12 BIVALVE
SPECIES, OF WHICH 5 CONTRIBUTED >9% OF THE BIOMASS. THE BIVALVE
COMMUNITY IS DOMINATED BY *CERASTODERMA EDULE* (L.) (BIOMASS, 2
 $B = 17.6 \text{ g m}^{-2}$; PRODUCTION, $P = 20.7 \text{ g m}^{-2} \text{ yr}^{-1}$)
& *MERCENARIA MERCENARIA* (L.) ($B = 8.5 \text{ g m}^{-2}$; $P = 4.14 \text{ g m}^{-2} \text{ yr}^{-1}$)
ALTHOUGH *MYTILUS EDULIS* L. ($B = 4.5 \text{ g m}^{-2}$) & *VENERUPIS AUREA* (Gmelin) ($B = 0.6 \text{ g m}^{-2}$)
(L.) ($B = 0.4-2 \text{ g m}^{-2}$) & *VENERUPIS AUREA* (Gmelin) ($B = 1.90 \text{ g m}^{-2}$) &
 m^{-2}) ARE LOCALLY COMMON, TOTAL MACROFAUNAL BIOMASS (190 g m^{-2}) &
PRODUCTION ($220 \text{ g m}^{-2} \text{ yr}^{-1}$) AT HAMBLEDON APPEARS HIGHER THAN
OTHER COMPARABLE SITES, ALTHOUGH SIMILAR TO MUSSEL BEDS. THE
ESTIMATED TRANSFERS OF BIVALVE BIOMASS TO PREDATORS (10.7 tonnes
 yr^{-1}) & SCAVENGERS/DECOMPOSERS ($18.2 \text{ tonnes yr}^{-1}$) SHOWS THE
IMPORTANCE OF THE BIVALVE COMMUNITY TO OTHER TROPHIC LEVELS.

HIBBERT, C.J.

1977 NO. 99
GROWTH AND SURVIVORSHIP IN A TIDAL FLAT POPULATION OF THE BIVALVE
MERCENARIA MERCENARIA FROM SOUTHAMPTON WATER

MAR BIOL 44: 71-76

A MONTHLY SAMPLING PROGRAMME WAS CONDUCTED TO INVESTIGATE ASPECTS OF THE BIOLOGY OF A POPULATION OF *MERCENARIA MERCENARIA* (L.). SMOOTH GROWTH CURVES WERE CONSTRUCTED FOR EACH YEAR CLASS, & THE FACTORS AFFECTING GROWTH RATE WERE CONSIDERED. SEASONAL CYCLES IN FLESH WEIGHT & CALORIFIC CONTENT APPEAR TO BE RELATED TO GONAD PROLIFERATION & SUBSEQUENT SPawning. RECRUITMENT IS SPORADIC & PROBABLY DEPENDS ON THE SPawning OF UPSTREAM POPULATIONS, WHERE CONDITIONS ARE MORE FAVORABLE FOR LARVAL DEVELOPMENT. SURVIVORSHIP CURVES WERE CONSTRUCTED FOR EACH YEAR CLASS; PREDATION BY CRABS & GULLS APPEARS TO ACCOUNT FOR A LARGE PROPORTION OF THE OBSERVED MORTALITY.

HOLLAND, A. F., AND J. M. DEAN
1976. NO.
THE BIOLOGY OF THE STOUT RAZOR CLAM, *TAGELUS PLEBEIUS*, ANIMAL
SEDIMENT RELATIONSHIP, FEEDING MECH & COMMUNITY BIOLOGY
CHESAPEAKE SCI 18(1): 58-66

SIX INTERTIDAL POPULATIONS OF *TAGELUS PLEBEIUS*, THE STOUT RAZOR CLAM, & ASSOCIATE MACROINVERTEBRATES WERE SAMPLED IN THE NORTH INLET ESTUARY, NEAR GEORGETOWN, SOUTH CAROLINA. *PLEBEIUS* SEDIMENTS, COMPOSED OF GREATER THAN 2.0% SILTS & CLAYS & WHICH WERE COVERED BY A VISIBLE SURFACE FILM OF BENTHIC MICROALGAE. GUT CONTENTS COVERED GILL MORPHOLOGY, & BEHAVIOR ALL INDICATED THAT THIS CLAM FUNCTIONED AS A SUSPENSION FEEDER OBTAINING ITS NUTRITION BY FILTERING SUSPENDED PARTICLES FROM THE WATER COLUMN. MAINTENANCE OF THE SIPHON TUBES & BURROWS WAS IMPORTANT TO THE SURVIVAL OF THIS ORGANISM. *T. PLEBEIUS* WAS QUANTITATIVELY AN IMPORTANT MEMBER OF THE INFAUNA WITHIN ITS HABITAT, COMPOSING 93.0% OF THE BIOMASS, BUT ONLY 3.2% OF THE TOTAL NUMBER OF INDIVIDUALS. SEDIMENT STABILITY, IN ADDITION TO AFFECTING THE DISTRIBUTION OF *PLEBEIUS*, ALSO HAD A SIGNIFICANT ROLE IN DETERMINING THE STRUCTURE OF INVERTEBRATE COMMUNITIES INHABITING THE INTERTIDAL SANDBARS SAMPLED. THESE STABLE MUDDY-SAND SEDIMENTS OF LAGOON AREAS SUPPORTED A MORE DIVERSE FAUNAL ASSEMBLAGE THAN DID THE LESS STABLE SANDY SEDIMENTS OF FRINGE AREAS OF THE SAME SANDBAR.

HOLLAND, A.F., AND J.M. DEAN
1977 NO. 75
THE BIOLOGY OF THE STOUT RAZOR CLAM, *TAGELUS PLEBEIUS*, ASPECTS
OF THE POPULATION DYNAMICS
CHESAPEAKE SCI 18(2): 188-196

THE POPULATION DYNAMICS OF THE STOUT RAZOR CLAM, *TAGELUS PLEBEIUS*, WERE INVESTIGATED FOR THREE YEARS. DENSITY, YEAR-CLASS STRUCTURE, & RECRUITMENT VARIED WITH ELEVATION ABOVE MEAN LOW WATER AMONG SAMPLED AREAS, & AMONG YEARS. RECRUITMENT WAS UNIMODELED & RESTRICTED TO THE LATE SPRING. OVER 80% OF THE JUVENILE RECRUITED IN THE SPRING WERE ABSENT FROM THE SAMPLE AREAS BY THE FOLLOWING FALL. GROWTH RATES OF *T. PLEBEIUS* VARIED WITH SEASON, AGE, & ELEVATION ABOVE MLW, BUT DID NOT VARY AMONG SAMPLE AREAS OR YEARS. *T. PLEBEIUS* GREW FASTER & REACHED A LARGER FINAL LENGTH IN LOW INTERTIDAL AREAS. THE AMERICAN OYSTER CATCHER, *HAEMATOPOUS PALLIATUS PALLIATUS*, & THE STINGGRAYS, *DASYATIS SABENA* & *DASYATIS AMERICANA*, WERE THE MAJOR CLAM PREDATORS IDENTIFIED.

HOLLAND, A.F., N. MOUNTFORD AND J. MIHURSKY
1977 NO. 08
TEMPORAL VARIATION IN UPPER BAY MESOHALINE BENTHIC COMMUNITIES:
THE 9-M MUD HABITAT
CHESAPEAKE SCI 18: 370-378.

YEARLY & SEASONAL CHANGES IN THE STRUCTURE OF THE MACROBENTHIC (>10 mm) COMMUNITY OCCURRING IN THE 9-m MUD HABITAT OF THE CALVERT CLIFFS REGION OF THE CHESAPEAKE BAY WERE EXAMINED FOR THREE YEARS. SEASONAL CHANGES IN THE NUMERICALLY DOMINANT SPECIES RESULTED IN VARYING COMMUNITY STRUCTURE & WAS CHARACTERIZED BY NEAR TOTAL FAUNAL DEPLETION DURING SUMMER, INITIAL RECOLONIZATION DURING EARLY FALL, SECONDARY RECOLONIZATION DURING LATE FALL & GROWTH & STRUCTURAL DEVELOPMENT DURING WINTER & SPRING. THE FAUNAL DEPLETION THAT OCCURRED EACH SUMMER CAUSED THE CYCLE TO REPEAT ON AN ANNUAL BASIS. THE STRUCTURE OF THE COMMUNITY WAS SIMILAR EACH YEAR DURING INITIAL RECOLONIZATION (FALL), BUT VARIED DURING SECONDARY RECOLONIZATION (WINTER & SPRING), REFLECTING THE RECRUITMENT SUCCESS OF SPECIES THAT REPRODUCE IN THE FALL (I.E., *MACOMA BALTHICA*, *MULINIA LATERALIS*, *NERETIS SUCCINEA*, & *PARAPRIONOSPIG PITTNA*). THESE FINDINGS HAVE PROFOUND IMPLICATIONS FOR THE DESIGN & INTERPRETATION OF POWER PLANT PREOPERATIONAL POSTOPERATIONAL IMPACT STUDIES.

HOLM, R.F.

NO. 77
1978 COMMUNITY STRUCTURE OF A TROPICAL MARINE LAGOON
ESTUARINE COASTAL MAR SCI 7: 329-345

THE STRUCTURE OF THE BENTHIC COMMUNITY IN A NEARSHORE TROPICAL MARINE LAGOON, IN THE UPPER FLORIDA KEYS, WAS EXAMINED IN EARLY SPRING & MID-SUMMER IN 1973 & 1974. EIGHT ENVIRONMENTAL PARAMETERS (WATER DEPTH, TIDAL RANGE, CURRENT FLOW, WATER TEMPERATURE, SALINITY, PH, SEDIMENT DEPTH & PARTICLE SIZE) WERE MONITORED. THE BIOTA WAS COMPARED ALONG AN INTERTIDAL-SUBTIDAL ENVIRONMENTAL GRADIENT. THE AMOUNT OF VEGETATION PRESENT & THE STABILITY OF THE SEDIMENT MODIFIED THE ABUNDANCE & DIVERSITY OF THE BENTHIC MACROFAUNA. THE RESULTS OF THIS STUDY ARE COMPARED WITH THOSE FROM OTHER AREAS IN THE TROPICAL WESTERN ATLANTIC OCEAN. THE UNIQUENESS OF THE LAGUNAR ENVIRONMENT MADE IT POSSIBLE TO EXAMINE THE CHANGES IN SPECIES ABUNDANCE & DIVERSITY AS A DETRITUS-BASED FOOD WEB GRADED INTO A PHYTOPLANKTON BASED-FOOD WEB.

HOOKS, T.A., K.L. HECK AND R.J. LIVINGSTON
1976 NO. 91
AN INSHORE MARINE INVERTEBRATE COMMUNITY: STRUCTURE AND HABITAT
ASSOCIATIONS IN THE NORTHEASTERN GULF OF MEXICO
BULL MAR SCI 26(1): 99-109

EPIBENTHIC MACROINVERTEBRATES OF FOUR PHYLA--ARTHROPODA, MOLLUSCA, ANNELIDA, & ECHINODERMATA--FROM UNPOLLUTED & POLLUTED ESTUARINE WATERS IN THE NORTHEASTERN GULF OF MEXICO WERE COLLECTED BY OTTER TRAWL & EXAMINED OVER AN 18-MONTH STUDY PERIOD. THE NUMBER OF SPECIES FOUND IN EACH SYSTEM WAS NOT SIGNIFICANTLY DIFFERENT, ALTHOUGH OVER TWO & ONE-HALF TIMES THE NUMBER OF INDIVIDUALS WERE COLLECTED FROM THE UNPOLLUTED AREA (CONFINA ESTUARY) THAN FROM THE POLLUTED AREA (ENHOLLOWAY ESTUARY). THE MOST ABUNDANT SPECIES WERE RELATIVELY MORE ABUNDANT IN THE UNPOLLUTED AREA. AT LEAST FOUR DIFFERENT HABITATS AVAILABLE TO THE ORGANISMS OCCUR IN THE STUDY AREA; ASSOCIATED WITH EACH IS A DISTINCT SPECIES GROUP. THE FOUR GROUPS INCLUDE THOSE SPECIES ASSOCIATED WITH (1) GRASSBEDS, (2) OYSTER BARS, (3) MUD FLATS, & (4) BENTHIC RED ALGAE.

HULBERG, L.W. AND J.S. OLIVER
NO. 32
1980.
CAGING MANIPULATIONS IN MARINE SOFT-BOTTOM COMMUNITIES: IMPORTANCE
OF ANIMAL-HABITAT INTERACTIONS OR SEDIMENTARY HABITAT MODIFICATIONS
CAN J FISH AQUAT SCI 37: 1130-1139.

CAGING MANIPULATIONS WERE PERFORMED IN TWO MARINE SOFT-BOTTOM COMMUNITIES TO TEST TWO NONEXCLUSIVE HYPOTHESES: (1) POLYCHAETE ABUNDANCE CHANGES IN CAGES ARE CAUSED BY THE PRESENCE OR ABSENCE OF PARTICULAR PREDATORS & COMPETITORS; (2) POLYCHAETE CHANGES IN CAGES ARE CAUSED BY ANIMALS RESPONDING TO CAGE-INDUCED CHANGES IN SEDIMENT DEPOSITION & EROSION. THE SIGNIFICANT CHANGES IN THE POLYCHAETE COMMUNITY beneath a VARIETY OF CAGES INSTALLED ON A HIGHLY WAVE-EXPOSED SAND-BOTTOM COULD NOT BE EXPLAINED BY THE PRESENCE OR ABSENCE OF PREDATORY DEMERSAL FISHES. THIS RESULT WAS OBTAINED DESPITE THE EXCLUSION OF FISH WHICH NORMALLY CONSUME LARGE NUMBERS OF INFAUNAL POLYCHAETES. A CAGING EXPERIMENT SIMILAR TO WOODIN'S (1974) WAS PERFORMED IN THE CHANNEL OF ELKHORN SLOUGH USING COMPARABLE CAGES & SIMILAR EXPOSURE PERIOD IN WOODIN'S EXPERIMENT. THE EXCLUSION OF A SEEDENTARY TUBE BUILDER WAS ACCOMPANIED BY AN INCREASE IN A MOBILE DEPOSIT FEEDER. THIS WAS INTERPRETED AS A COMPETITIVE RELEASE IN OUR EXPERIMENT, NO SEDENTARY SPECIES INHABITED THE CHANNEL & NONE WERE EXCLUDED; NEVERTHELESS, THIS SAME MOBILE SPECIES INCREASED INSIDE THE CAGES. ALTHOUGH THE IMPORTANCE OF POTENTIAL PREDATORS & COMPETITORS WAS NOT DOCUMENTED IN THE CAGING EXPERIMENTS, ALL OF THE SAND-FLAT & SLOUGH CAGING RESULTS ARE CONSISTENT WITH THE HYPOTHESIS THAT ANIMALS RESPOND TO SEDIMENTARY HABITAT MODIFICATIONS CREATED BY CAGES. THIS HYPOTHESIS IS NOT CONSIDERED IN MOST CAGING EXPERIMENTS IN MARINE SOFT-BOTTOM COMMUNITIES.

HYNES, H. B. N. AND M. J. COLEMAN.
1968 NO. 27
A SIMPLE METHOD OF ASSESSING THE ANNUAL PRODUCTION OF STREAM
BENTHOS
LIMNOL OCEANOGR 13(4) : 569-573.

IT IS POSSIBLE TO CALCULATE THE ANNUAL PRODUCTION OF STREAM
BENTHIC ANIMALS FROM DATA OBTAINED FROM A SERIES OF GOOD
QUANTITATIVE SAMPLES COLLECTED AT INTERVALS DURING THE YEAR. THE
METHOD IS EXPLAINED AND ITS LIMITATIONS AND SHORTCOMINGS ARE
DISCUSSED. THIS SEEMS AT PRESENT TO BE THE ONLY SIMPLE AND DIRECT
METHOD OF ESTIMATING PRODUCTION.

IVLEV, V. S.

IVILEY, V. S. NO. 7
1966. THE BIOLOGICAL PRODUCTIVITY OF WATERS
J FISH RES BOARD CAN 23(11): 1727-1758.

JOHNSON, M. G.

1971 NO. 52
ANIMAL-SEDIMENT RELATIONS IN SHALLOW WATER BENTHIC COMMUNITIES
MAR GEOL 11: 93-104.

NINETY BENTHIC SAMPLES WERE USED TO STUDY ANIMAL-SEDIMENT RELATIONS IN TOMALES BAY, CALIFORNIA. WHILE MOST OF THE BENTHIC SPECIES STUDIED WERE FOUND MORE OFTEN IN A PARTICULAR TYPE OF SUBSTRATE INDIVIDUALS OF SUCH SPECIES WERE OCCASIONALLY FOUND IN OTHER SUBSTRATES. THERE IS A STRIKING TENDENCY FOR SPECIES OCCURRING OUTSIDE OF THEIR CHARACTERISTIC ENVIRONMENT TO BE ASSOCIATED WITH THE MOST DIVERSE ASSEMBLAGES OF THE FOREIGN SUBSTRATE SPECIES LOW IN THE ORDER OF SUCCESSION ARE THOSE SPECIES THAT ARE FOUND MORE FREQUENTLY ON OTHER SUBSTRATES. THESE PHENOMENA ARE EXPLAINED IN TERMS OF ENVIRONMENTAL STABILITY. THE CONCEPTS INVOLVED SUGGEST A MEANS OF PREDICTING THE SEQUENCE OF FAUNAL CHANGES FOLLOWING THE ALTERATION OF THE SUBSTRATE. A COMMONLY USED INDEX OF DIVERSITY (BRILLOUIN'S EQUATION) WAS FOUND TO BE VERY SENSITIVE TO THE OCCURRENCE OF TWO UBIQUITOUS SPECIES. A HIGH CORRELATION WAS OBTAINED BETWEEN THE NUMBER OF SPECIES & THE INDEX OF DIVERSITY WHEN THE TWO UBIQUITOUS SPECIES WERE NOT CONSIDERED. THE BENTHIC ENVIRONMENT OF TOMALES BAY IS GRADATIONAL & FAUNAL VARIATION IS CORRESPONDINGLY CONTINUOUS. UNDER SUCH CIRCUMSTANCES, THE ANIMAL-SEDIMENT RELATIONS DESCRIBED ARE PROBABLY MORE APPARENT THAN IN AREAS WHERE THE SLOPE OF THE ENVIRONMENTAL GRADIENT IS GREATER. SIMILAR RELATIONS WOULD BE EXPECTED, HOWEVER, IN THE DEEP SEA & IN CONTINUOUS STRATIGRAPHIC SEQUENCES IN THE GEOLOGIC RECORD.

JOHNSON, M.G. AND R.O. BRINKHURST
1971 NO. 19
BENTHIC COMMUNITY METABOLISM IN BAY OF QUINTE AND LAKE ONTARIO
J FISH RES BOARD CAN 28: 1715-1725.

RATES OF SEDIMENTATION OF ORGANIC MATTER TO THE BOTTOM SEDIMENTS AT FOUR STATIONS (IN ORDER FROM THE INNER BAY OF QUINTE TO OPEN LAKE ONTARIO) AVERAGED 1.91', 0.42', 0.36' & 0.21'. GM-2 DAY-1 DAY-2 DAY-1 APPROXIMATELY 90% OF IMPORTED ENERGY (IM) WAS USED BY THE BENTHIC COMMUNITIES AT THE THREE LAKEWARD STATIONS & 23% AT THE INNER BAY STATION. LOW UTILIZATION IN THE INNER BAY WAS SUBSTANTIATED BY THE HIGH ORGANIC MATTER (28%) IN SEDIMENTS THERE, IN CONTRAST WITH LAKE ONTARIO SEDIMENTS (3-4%). SLOW UTILIZATION OF ALLOCHTHONOUS IMPORTS ONLY 2% OF IMPORTED ENERGY WAS PROPORTIONAL OF MACROINVERTEBRATES IN THE INNER BAY, IN CONTRAST ASSIMILATED BY MACROINVERTEBRATES IN THE LAKEWARD STATIONS. WITH ABOUT 30% AT THE LAKEWARD STATIONS. A CONCISE MODEL OF MACROINVERTEBRATE PRODUCTION, $P = C \cdot B \cdot IM$ (WHERE C IS THE PROPORTION OF GROWTH TO RESPIRED & EXPORTED ENERGY & B IS DERIVED FROM THE AVERAGE GROWTH EFFICIENCY OF MACROINVERTEBRATES, A IS PROPORTION OF IMPORTED ENERGY USED BY THE TOTAL BENTHIC COMMUNITY, & B IS PROPORTION OF THE LATTER USED BY MACROINVERTEBRATES), WAS USED TO DEDUCE THE RELATION BETWEEN PRODUCTION & IMPORT. ALL OF THE PARAMETERS A, B, & C PRESUMABLY DECREASE WITH INCREASING IMPORT, ALTHOUGH C MAY BE LOW INITIALLY AT LOW IMPORT & SPARSE FOOD SUPPLY.

JOHNSON, M.G. AND R.O. BRINKHURST
1971 NO. 6
ONTARIO PRODUCT OF BENTHIC MACROINVERTEBRATES OF BAY OF QUINTE AND LAKE
J FISH RES BOARD CAN 28(11): 1699-1714.

PRODUCTION RATES (P) BY BENTHIC MACROINVERTEBRATES, OBTAINED FROM DATA ON INSTANTANEOUS GROWTH RATE & BIOMASS (B), RANGED FROM 0.26 KCAL M⁻² DAY⁻¹ AT THE INNER BAY STATION TO 0.80 IN THE OUTER BAY, 0.19 AT THE BAY MOUTH, 0.16 OUTSIDE THE BAY OF QUINTE, & 0.04 IN THE MAIN BASIN OF LAKE ONTARIO. RESPIRATION RATES (R) OF THE COMMON SPECIES WERE FITTED TO THE GENERAL MODEL LOGE R = A₁T + A₂LOGW, WHERE T IS TEMPERATURE & W IS ANIMAL WEIGHT. Q10'S AVERAGED 3.5 & EXPONENTS OF ANIMAL WEIGHT AVERAGED 0.74. GROWTH EFFICIENCIES (PRODUCTION AS A PROPORTION OF ASSIMILATION) DECLINED PROGRESSIVELY FROM ABOUT 0.65 AT THE INNER BAY STATION TO 0.35 AT THE LAKE ONTARIO STATION. ANNUAL TURNOVER RATIOS (P:B RATIOS) DECLINED FROM 13 IN THE INNER BAY TO ABOUT 1 IN THE DEEP SEDIMENTS OF LAKE ONTARIO. TURNOVER RATIO (TR) WAS CORRELATED WITH MEAN ANNUAL BOTTOM TEMPERATURE (T), TR = T²/10, & PRODUCTION WAS PREDICTED BY P = B T²/10.

JOHNSON, R.G.
1974 NO. 50
PARTICULATE MATTER AT THE SEDIMENT-WATER INTERFACE IN COASTAL
ENVIRONMENTS J MAR RES 32(2): 313-330.

A MICROSCOPIC STUDY WAS MADE OF MARINE SEDIMENTS TO IDENTIFY THE KINDS OF MATERIALS PRESENT AT THE SEDIMENT-WATER INTERFACE & TO DESCRIBE THESE MATERIALS FROM A BIOLOGICAL POINT OF VIEW. FIFTY-TWO SAMPLES WERE COLLECTED AT 16 STATIONS IN THE VICINITY OF WOODSHOLE, MASSACHUSETTS. A TOTAL OF 61 PARTICLE SPECIES WAS RECOGNIZED, UP TO 69% OF THE QUARTZ PARTICLES WERE ENCRUSTED WITH ORGANIC MATTER. ALL OF THE SAMPLES VARYING FROM 11 TO 71% PARTICLE ABUNDANCE NEARLY ALL OF THE CLAY & SILT SIZE PARTICLES WERE AGGREGATES INCORPORATED IN AN ORGANIC MATRIX. THE ORGANIC MINERAL AGGREGATES PROBABLY ARE THE PRODUCTS OF THE RECYCLING OF ORGANIC MATTER BY DEPOSITED FEEDERS. AN AVERAGE OF SIXTY-ONE PERCENT OF THE PARTICLES EXAMINED IN SAMPLES OF SURFICIAL SEDIMENTS WERE POTENTIAL FOOD PARTICLES. THE STANDARD METHODS OF DESCRIBING SEDIMENTS ARE INADEQUATE FOR UNDERSTANDING ANIMAL SEDIMENT RELATIONS & GEOLOGICAL PROCESSES. ENCRUSTED PARTICLES & ORGANIC-MINERAL AGGREGATES MUST HAVE DIFFERENT SEDIMENTOLOGICAL PROPERTIES THAN CLEAN OR FREE MINERAL PARTICLES. THUS, WHILE THE BULK ANALYSIS OF A SEDIMENT MAY REVEAL ONLY A FEW PERCENT ORGANIC MATTER, THAT MAY BE ONE OF ITS MOST IMPORTANT PROPERTIES.

JOHNSON, R. G.
NO. 51
1977 VERTICAL VARIATION IN PARTICULATE MATTER IN THE UPPER TWENTY
CENTIMETERS OF MARINE SEDIMENTS
J MAR RES 35(2): 273-282.

A MICROSCOPIC EXAMINATION WAS MADE OF THE VERTICAL DISTRIBUTION & ABUNDANCE OF PARTICULATE MATTER IN SIX DISSIMILAR CORES OF MARINE SEDIMENT. TWO OF THE CORES WERE TAKEN IN THE INTERTIDAL & TWO IN THE SHALLOW SUBTIDAL STATIONS IN THE VICINITY OF WOODS HOLE, MASSACHUSETTS. ONE CORE WAS TAKEN IN THE HUDSON CANYON & ANOTHER AT ABYSSAL DEPTHS. BIOLOGICAL STAINS WERE USED TO IDENTIFY POTENTIAL FOOD PARTICLES AT THE SEDIMENT-WATER INTERFACE, AT TWO CM BELOW THE INTERFACE & AT FIVE CM INTERVALS TO A MAXIMUM DEPTH OF 20 CM. IN ALL THE CORES, THE UPPER TWO CM WERE SLIGHTLY HIGHER IN NUMBER OF POTENTIAL FOOD PARTICLE SPECIES. BELOW 2 CM, TO A DEPTH OF AT LEAST 20 CM, THE SEDIMENT WAS RELATIVELY HOMOGENEOUS WITH REGARD TO PARTICLE SPECIES NUMBER, PARTICLE MORPHOLOGY & ORGANIC CONTENT. THIS HOMOGENEITY IS INTERPRETED AS THE RESULT OF THE RECYCLING OF THE SEDIMENTS BY BENTHIC ANIMALS & RAPID RECOLONIZATION OF THE PARTICULATE MATTER BY MICROBES.

JUMARS, P.A. AND K. FAUCHALD
1977 NO. 14
BETWEEN-COMMUNITY CONTRASTS IN SUCCESSFUL POLYCHAETE FEEDING
STRATEGIES

COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS:1-20

BENTHIC MARINE POLYCHAETES ARE HEREIN CLASSIFIED ON THE BASIS OF SEVERAL FEEDING STRATEGY PARAMETERS; NOTABLY DEGREE OF MOTILITY & FEEDING STRATUM (SUSPENSION, SURFACE, SUBSURFACE DEPOSIT), ALONG A DEPTH TRANSECT FROM THE SOUTHERN CALIFORNIA COAST (2.4 M) TO THE CENTRAL NORTH PACIFIC (5600 M); THE RELATIVE ABUNDANCE OF SESSILE INDIVIDUALS INCREASES ($P < 0.00001$) WITH DEPTH TO AT LEAST 400 M & THEN DECREASES AT GREATER DEPTHS & ABYSSAL DEPTHS. THE INCREASE IS POSTULATED TO BE A RESPONSE TO INCREASING SEDIMENT INSTABILITY WHILE THE SUBSEQUENT DECREASE MAY BE ATTRIBUTABLE TO RELATION BETWEEN OPTIMAL MOBILITY & FOOD AVAILABILITY. VARIATION IN SEDIMENT FORAGING AREA & FOOD INPUT MIGHT SIMILARLY ACCOUNT FOR MANY OTHER BIOGEOGRAPHIC PATTERNS.

STANDING CROP, POPULATION SIZE, & SPECIES DIVERSITY OF THE MACROBENTHIC ORGANISMS IN AN ESTUARINE CHANNEL WERE STUDIED BEFORE & AFTER DREDGING. A NEW SUCTION-CORER WHICH SAMPLED AN AREA 0.1 M² TO A DEPTH OF 30 CM WAS USED IN ORDER TO INSURE THE INCLUSION OF LARGE, DEEP-DWELLING ANIMALS. ELEVEN MONTHS AFTER DREDGING, TO PRETBIOMASS & NUMBER OF SPECIES & SPECIMENS HAD NOT RECOVERED TO PRE-TDREDGING LEVELS. COLONIZATION BEGAN WITH RELATIVELY LARGE, SWIFTLY MOVING FORMS SUCH AS THE TERRANT POLYCHAETE NEREIS SUCCLINA & THE CRAB NEOPANOPUS TEXANA SAY. STATIONS IN SILT & MUD REGIONS RECOVERED MORE SLOWLY THAN THOSE IN SANDIER SEDIMENTS. MOST OF THE DOMINANT & SUBDOMINANT SPECIES HAD NOT RECOVERED 11 MONTHS AFTER DREDGING, & THE PREVIOUSLY ABUNDANT POLYCHAETE NOTOMASTUS LATERICIEUS & CLYMENELLA TORQUATA HAD VIRTUALLY DISAPPEARED. ONLY RELATIVELY UNCOMMON LAMELLIBRANCHS SUCH AS TELLINA AGILIS, LYONIA HYALINA & MULUNIA LATERALIS INCREASED AFTER DREDGING. DISTRIBUTION OF SEDIMENT TYPES CHANGED AS THE RESULT OF MODIFIED TIDAL VELOCITIES IN THE CHANNEL. MUD & SILT WERE REMOVED BY THE DREDGE, EXPOSING THE SAND UNDERNEATH, & SANDY STATIONS BECAME MUDDIER AS THE RESULT OF LOWERED CURRENT VELOCITIES. MARKED CHANGES IN SPECIES COMPOSITION REFLECTED THIS CHANGE IN SEDIMENT CHARACTER. ELEVEN MONTHS AFTER DREDGING NO EVIDENCE OF SUCCESSION WAS FOUND, BUT COLONIZATION HAD BEGUN. VALUES OF ALL THREE PARAMETERS STUDIED WERE REDUCED TO SMALL FRACTIONS OF PRE-DREDGING LEVELS, ALTHOUGH SPECIES DIVERSITY IN SANDY SEDIMENTS EXCEEDED PRE-DREDGING LEVELS.

KRAVITZ, M. J. AND H. R. JONES
1979 NO. 60
SYSTEMATICS AND ECOLOGY OF BENTHIC PHYLLODOCIDAE (ANNELIDA:
POLYCHAETA) OFF THE COLUMBIA RIVER, U.S.A.
BULL. CALIF. ACAD. SCI. 78(1): 1-19.

THE BENTHIC PHYLLODOCID POLYCHAETE FAUNA OF THE CONTINENTAL SHELF
OFF THE COLUMBIA RIVER, NORTHERN OREGON, & SOUTHERN WASHINGTON, AT
DEPTHS OF 11 TO 97 M, IS REPORTED. THREE SPECIES OF ETETONE & ONE
SPECIES OF ANAITIDES ARE NEWLY DESCRIBED. ETETONE (MYSTACIS) BARBATA
IS NEWLY REPORTED IN THE NORTHEAST PACIFIC OCEAN. RANGES ARE
EXTENDED FOR ETETONE LONGA, ANAITIDES HARTMANNAE & ANAITIDES
LONGIPES. THE LATTER TWO SPECIES NEW TO OREGON & WASHINGTON: E.
LONGA IS NEW TO OREGON. NEW RECORDS ARE GIVEN FOR ETETONE
CALIFORNICA & EUULIA LEVICORNUTA. THE LOCAL DISTRIBUTION,
INCLUDING DEPTHS & SEDIMENT TYPE(S), OF EACH SPECIES IS SUMMARIZED
THE DISTRIBUTIONS OF ALL SPECIES IN THE GENUS ANAITIDES OVERLAPPED
WHILE THOSE OF SOME SPECIES IN ETETONE WERE RELATIVELY SEGREGATED.
THE OCCURRENCE OF ETETONE FOLLOWING THE DUMPING OF DREDGED
SEDIMENTS FROM THE COLUMBIA RIVER MOUTH IS DISCUSSED.

LACAZE, J. AND O. DE NAIDE
1977 NO. 15
EFFECT OF ORGANIC EXCRETION BY BENTHIC ANNELIDA ON THE
PRODUCTIVITY OF PHYTOPLANKTON
INT. REVUE GES. HYDROBIOLOGIE 62(1): 153-155.

THE INCORPORATION OF AN ORGANIC CHELATING AGENT (EDTA) IN
WATER CONTAINING THE BENTHIC POLYCHAETE SABELLA PAVONIA FOR 16
HOURS CAUSES AN INCREASE OF 25% IN PRIMARY PRODUCTION.

LARSEN, P. F.
1979 NO. 47
THE SHALLOW-WATER MACROBENTHOS OF A NORTHERN NEW ENGLAND ESTUARY
MAR BIOL 55: 69-78.

IN NOVEMBER 1973 THE BENTHIC MACROFAUNA OF TWO SHALLOW-WATER AREAS IN THE LOWER SLEEPSLOT RIVER ESTUARY (NEW ENGLAND, USA) WAS QUANTITATIVELY SAMPLED. NUMERICAL CLASSIFICATION OF THE DATA, IN BOTH THE NORMAL & INVERSE MODES, PRODUCED 4 SITE-GROUPS & 7 SPECIES-GROUPS. EACH SITE-GROUP WAS CHARACTERIZED BY AT LEAST ONE OF THE FAUNA OF THE SITE-GROUPS DIFFERED IN SEVERAL COMMUNITY PARAMETERS, PARTICULARLY THE PATTERNS OF SEVERAL DOMINANCE, BUT IT WAS NOT POSSIBLE TO CORRELATE THESE DIFFERENCES WITH ANY OF THE SEVERAL EXTRINSIC FACTORS MEASURED. A FACTOR, OR FACTORS, RELATED TO WATER-COLUMN STABILITY IS THE PROBABLE OVER RIDING ECOLOGICAL DETERMINANT OF THE OBSERVED COMMUNITY PATTERNS. COMPARISONS WITH AN EARLIER INVESTIGATION IN 1955 DEMONSTRATE DRAMATIC CHANGES IN DENSITY, DOMINANCE & SPECIES COMPOSITION.

1979.

NO. 9
THE EFFECTS OF TEMPERATURE ON THE RESPIRATION AND PRODUCTION
OF THE FRESHWATER NEMATODE ANONCHUS SP.
ECOLOGIA (BERL.). 41: 329-337.

GROWTH & RESPIRATION WERE MEASURED IN A SPECIES OF ANONCHUS (NEMATODA: PLECTIDAE) AT 5°C, 10°C, 15°C, 20°C & 25°C. NO GROWTH WAS MEASURABLE BUT THE ORGANISMS REMAINED ACTIVE. MAXIMUM PRODUCTION OCCURRED AT 15°C, BUT THE HIGHEST RATE OF GROWTH OCCURRED AT 20°C. THUS, ADULT SIZE ATTAINED IS DEPENDENT ON THE TEMPERATURE OF GROWTH. RESPIRATORY ENERGY LOSSES DERIVED FROM CARTESIAN DIVERGORESPIROMETRY (INCREASED WITH TEMPERATURE UP TO 25°C. REGRESSION COEFFICIENTS (B VALUES) DERIVED FROM A LOG LOG LINEAR REGRESSION OF WEIGHT AGAINST OXYGEN CONSUMPTION VARIED BETWEEN 0.574-1.793. THE LOWEST VALUE BEING ATTAINED AT 5°C. THE HIGHEST AT 20°C. BASED ON Q₁₀, PRODUCTION & RESPIRATORY ENERGY LOSSES, THE OPTIMUM TEMPERATURES FOR ANONCHUS APPEARS TO LIE BETWEEN 10°C-15°C.

LIEU, AND J.C. KELLEY
1970 NO. 90
BENTHIC INFAUNA COMMUNITIES OFF THE COAST OF WASHINGTON AND IN
PUGET SOUND: IDENTIFICATION AND DISTRIBUTION OF COMMUNITIES
J FISH RES BOARD CAN 27: 621-651

BENTHIC INFAUNA WAS COLLECTED AT 37 STATIONS IN PUGET SOUND, IN JUAN DE FUCA STRAIT, & OFF THE NORTHWESTERN COAST OF WASHINGTON DURING THE SUMMER OF 1967, & AT 18 ADDITIONAL STATIONS OFF THE SOUTHWESTERN COAST OF WASHINGTON DURING THE SUMMER OF 1968. THE CRUSTACEANS, LAMELLIBRANCHS, & ECHINODERMS WERE IDENTIFIED & COUNTED & THE DATA WERE SUBJECTED TO AN ANALYSIS OF AFFINITY AMONG STATIONS, TO FAGER'S RECURRENT GROUP ANALYSIS, & TO FACTOR ANALYSIS FOR IDENTIFICATIONS OF THE BENTHIC COMMUNITIES & THE GROUPINGS OF BENTHIC SPECIES IN THE INVESTIGATED AREA. TRELLIS-DIA GRAMS OF INDICES OF AFFINITY AMONG THE STATIONS, BASED ON THE PRESENCE OR ABSENCE OF SPECIES, INDICATED FOUR RATHER DISTINCT GROUPS OF STATIONS WITH SPECIFIC GEOGRAPHIC DISTRIBUTIONS OR RELATIONS TO CERTAIN SEDIMENT TYPES. FAGER'S RECURRENT GROUP ANALYSIS FOR THE 36 MOST FREQUENTLY OCCURRING SPECIES RESULTED IN EIGHT GROUPS & FIVE SPECIES THAT WERE STRONGLY ASSOCIATED WITH ONE OR MORE OF THE RECURRENT GROUPS. MOST TESTS OF INTERSPECIFIC RELATIONS AMONG THE SPECIES WITHIN THE GROUPS WERE NOT SIGNIFICANT & IT WAS CONCLUDED THAT THE ANALYSIS WAS ONLY PARTLY USEFUL FOR DELIMITING SPECIES GROUPS WITH ECOLOGICAL SIGNIFICANCE. THE Q-MODE OF THE FACTOR ANALYSIS RESULTED IN THREE GROUPS OF STATIONS DISTRIBUTED IN BANDS PARALLEL TO THE COAST, & EACH GROUP OF STATIONS (COMMUNITY) COULD BE RECOGNIZED BY ITS DISTINCT SEDIMENT TYPES OR DEPTH DISTRIBUTION. THE R-MODE OF THE FACTOR ANALYSIS GAVE SIX GROUPS OF SPECIES WITH SPECIFIC PREFERENCES OF DEPTHS, SEDIMENT TYPES, OR GEOGRAPHIC DISTRIBUTION. THE RESULTS OF THE VARIOUS TECHNIQUES WERE COMPARED, & THEIR APPLICATION IN BENTHIC SYNECOLOGY WAS DISCUSSED.

LITTLE, C. AND W. NIX
1976 NO. 84

THE BURROWING AND FLOATING BEHAVIOUR OF THE GASTROPOD HYDROBIA
ULVÆ
ESTUARINE COASTAL MAR SCI 4: 537-544.

THE BEHAVIOUR OF HYDROBIA ULVÆ HAS BEEN INVESTIGATED AT SEVERAL
LOCALITIES ON THE BRITISH COAST. NO EVIDENCE OF RHYTHMIC BEHAVIOUR
PATTERNS, PREVIOUSLY POSTULATED FROM LABORATORY STUDIES, HAS BEEN
FOUND. FLOATING APPEARS TO BE AN ACCIDENTAL PHENOMENON, BROUGHT
ABOUT BY A VARIETY OF MECHANISMS. IT MAY AID SPECIES DISPERSAL.

LIVDAHL, T.P.

1979 NO. 36
ENVIRONMENTAL UNCERTAINTY AND SELECTION FOR LIFE CYCLE DELAYS IN
OPPORTUNISTIC SPECIES
AM NAT 113(6): 835-842

A MODEL IS PRESENTED WHICH CONSIDERS GENETIC VARIATION IN THE DURATION OF EGG DORMANCY IN POPULATIONS OCCUPYING LARVAL HABITATS THAT OCCASIONALLY BECOME ENTIRELY UNSUITABLE. THE PROBABILITY OF SUCH A CATASTROPHE & THE NET REPRODUCTIVE RATE IN THE ABSENCE OF CATASTROPHES (& IN DENSITY INDEPENDENT CONDITIONS) DETERMINE THE CONDITIONS REQUIRED FOR FIXATION OF EITHER THE EARLY-OR LATE-HATCHING ALLELE. THE MODEL SHOWS THAT A MORE CATASTROPHIC ENVIRONMENT WILL FAVOR THE LATE-HATCHING ALLELE PRESENTING THE POSSIBILITY FOR A DECLINE IN RM WITH AN INCREASE IN ENVIRONMENTAL UNCERTAINTY. THE IMPLICATIONS OF THIS RESULT TO THE CONCEPT OF R-SELECTION ARE DISCUSSED & EXAMPLES OF SYSTEMS WHERE THE MODEL COULD APPLY ARE PRESENTED.

LIVINGSTON, R. J. NO. 06
DIURNAL AND SEASONAL FLUCTUATIONS OF ORGANISMS IN A NORTH
FLORIDA ESTUARY
ESTUARINE COASTAL MAR SCI 4: 373-400

MONTHLY SAMPLES OF DEMERSAL FISHES & INVERTEBRATES WERE TAKEN IN AN UNPOLLUTED, RIVER-DOMINATED ESTUARY IN NORTH FLORIDA (APALACHICOLA BAY) FOR A 2-YEAR PERIOD. TRAWLING METHODS WERE EXAMINED. SMALL (2-MIN) REPETITIVE SAMPLES YIELDED SUBSTANTIALLY HIGHER NUMBERS OF INDIVIDUALS & SPECIES THAN SINGLE (14-MIN) TRAWL-TOWS. VARIOUS METHODS OF ANALYSIS WERE USED TO DETERMINE ADEQUATE SAMPLE SIZE FOR COMPARATIVE ANALYSIS. INDICES OF DIVERSITY WERE COMPARED. INDICES WERE COMPARED. INDICES WERE COMPARED. SEVERAL DIURNAL (24-H) & SEASONAL VARIATIONS OF SUCH PARAMETERS WERE RELATED TO COMPLEX INTERACTIONS WHICH INCLUDED RIVERFLOW, SALINITY VARIATIONS & TEMPERATURE CHANGES. THE VARIOUS SPECIES DIVERSITY INDICES WERE HIGHLY CORRELATED IN SPITE OF THEORETICAL DISTINCTIONS THERE WERE VARYING RELATIONSHIPS OF SUCH PARAMETERS WITH THEIR RICHNESS & EQUIVABILITY COMPONENTS & THESE RELATIONSHIPS WERE NOT ALWAYS THE SAME FOR FISHES & INVERTEBRATES. THERE WERE BASIC DIFFERENCES IN SPECIES COMPOSITION & NUMBERS OF INDIVIDUALS OF INVERTEBRATES TAKEN THROUGHOUT A 24-H PERIOD. FOR FISHES, SUCH VARIATIONS WERE PRIMARILY QUANTITATIVE WITH SOME SHORT-TERM ALTERATION OF COMMUNITY STRUCTURE. SEASONAL PEAKS OF NUMBERS OF INDIVIDUALS, NUMBERS OF SPECIES & SPECIES DIVERSITY USUALLY OCCURRED DURING SUMMER & FALL PERIODS. ALTHOUGH THERE WERE SOME VARIATIONS, A GENERAL PATTERN OF AN ANNUAL DOUBLE PEAK OF FISH & INVERTEBRATE RICHNESS & DIVERSITY WAS NOTED. NOCTURNAL PATTERNS WERE MORE CLEARLY DEFINED THAN DIURNAL ONES. RELATIVE DOMINANCE REMAINED HIGH, WITH A SEASONAL DISCUSSION OF DOMINANT FISH & INVERTEBRATE SPECIES. IT WAS POSTULATED THAT THERE WAS A CONSTANTLY CHANGING SERIES OF INTERACTIONS OF THE VARIOUS COMMUNITY COMPONENTS THAT PRECLUDED A SINGLE MECHANISM FOR THE OBSERVED PHENOMENA. APALACHICOLA BAY WAS SEEN AS AN UNPOLLUTED SYSTEM THAT UNDERWENT CONSIDERABLE SEASONAL FLUCTUATIONS OF RICHNESS & DIVERSITY IN RESPONSE TO EXTREME VARIATIONS OF NATURAL (PHYSICAL) FUNCTIONS. SUCH CHANGES WERE STABLE OVER TIME, & THIS FORM OF VARIATION WAS SEEN AS A CONSIDERABLE LIMITATION TO THE GENERAL USE OF SPECIES DIVERSITY AS AN INDICATOR OF POLLUTION &

LIVINGSTON, R. J. ET AL.
1976. NO. 62
LONG-TERM FLUCTUATIONS OF EPIBENTHIC FISH AND INVERTEBRATE
POPULATIONS IN APALACHICOLA BAY, FLORIDA
FISH BULL 74(2): 311-321.

A 3-YR STUDY WAS MADE CONCERNING SEASONAL CHANGES IN THE BIOTA OF APALACHICOLA BAY. THE APALACHICOLA RIVER CAUSES A TEMPORAL PROGRESSION OF CHANGES OF VARIOUS ENVIRONMENTAL PARAMETERS IN THE BAY SUCH AS SALINITY, TURBIDITY, NUTRIENTS, & DETRITUS LEVELS. THE FISHES WERE MORE WIDESPREAD IN THEIR DISTRIBUTION THROUGHOUT THE BAY THAN INVERTEBRATES. THIS WAS THOUGHT TO BE RELATED TO TROPHIC RESPONSE & HABITAT PREFERENCE. HIGH LEVELS OF RELATIVE DOMINANCE PREVAILED FOR BOTH GROUPS WITH THE TOP THREE SPECIES OF EACH GROUP ACCOUNTING FOR MORE THAN 80% OF THE TOTAL NUMBER OF INDIVIDUALS TAKEN. PEAK LEVELS OF MONTHLY ABUNDANCE OF VARIOUS DOMINANT FISH SPECIES TENDED NOT TO OVERLAP THROUGH A GIVEN 12-MO PERIOD. INVERTEBRATE SPECIES ABUNDANCE USUALLY REACHED PEAK LEVELS DURING SUMMER & FALL PERIODS. THE SEASONAL APPEARANCE & DISTRIBUTION OF ORGANISMS IN THE APALACHICOLA BAY SYSTEM WAS COMPARABLE TO THAT FOUND IN OTHER ESTUARIES IN THE NORTHERN GULF OF MEXICO. THE TEMPORAL & SPATIAL DISTRIBUTION OF EUSTARINE FISHES & INVERTEBRATES WAS ASSOCIATED WITH SPECIES-SPECIFIC REPRODUCTIVE CYCLES, TROPHIC RELATIONSHIPS, & HABITAT PREFERENCES. THE APALACHICOLA ESTUARY WAS VIEWED AS A SEASONALLY STABLE SYSTEM, WITH REGULAR TEMPORAL FLUCTUATIONS OF THE BIOTA THROUGH EACH ANNUAL CYCLE.

LUBCHENCO, J. AND B.A. MENGE
1978. NO. 67
COMMUNITY DEVELOPMENT AND PERSISTANCE IN A LOW ROCKY INTERTIDAL
ZONE
ECOL MONogr 59: 67-94.

THIS PAPER ANALYZES THE FACTORS CONTROLLING THE DEVELOPMENT & DIVERSITY OF SPACE USERS IN THE LOW ROCKY INTERTIDAL ZONE OF NEW ENGLAND. THE SPATIAL STRUCTURE OF THIS COMMUNITY CHANGES ALONG A WAVE EXPOSURE GRADIENT. MUSSELS (*MYTILUS EDULUS*) DOMINATE AT HEADLANDS EXPOSED AT WAVE SHOCK. THE ALGA *CHONDRUS CRISPUS* (IRISH MOSS) DOMINATES AT SITES PROTECTED FROM WAVE SHOCK & BOTH ARE ABUNDANT AT AREAS INTERMEDIATE IN EXPOSURE TO WAVES. USING A COMBINATION OF EXPERIMENTS (EXCLOSURES, ENCLOSEMENTS, REMOVALS) & OBSERVATIONS, WE EVALUATED THE EFFECTS OF SEVERAL FACTORS ON THIS SYSTEM, INCLUDING (1) PREDATION, (2) HERBIVORY, (3) PLANT-PLANT COMPETITION, (4) PLANT-ANIMAL COMPETITION, & (5) PHYSICAL DISTURBANCE FROM HIGH-ENERGY WAVES. THE INTERACTION HAVING THE GREATEST EFFECT ON THE STRUCTURE OF THIS LOW ZONE ASSOCIATION WAS PREDATION. AT PROTECTED SITES, THE STARFISH *ASTERIAS FORBEI*, *ASTERIAS VULGARIS*, & THE SNAIL, THAIS *LAPILLUS* PREY HEAVILY ON *MYTILUS*, WHICH IS THE FUNCTIONALLY DOMINANT COMPETITOR IN THE LOW (& MID) ZONE(S). WHEN SECONDARY SUCCESSION IS INITIATED BY REMOVAL OF ALL ERECT ANIMALS & PLANTS, COMMUNITY DEVELOPMENT IN THE ABSENCE OF THESE PREDATORS (& PREDATOR-EXCLUSION) RESULTS IN COMPETITIVE ELIMINATION OF BOTH THE BARNACLES *BALANUS BALANOIDES* & *CHONDHRUS* BY *MYTILUS*. A SIMILAR RESULT OCCURS IF PREDATORS ARE EXCLUDED FROM UNALTERED STANDS OF *CHONDHRUS*. USUALLY, IN THESE EXPERIMENTS (IE, WITH PREDATORS PRESENT), USUALLY EITHER DEVELOPS TO, OR REMAINED AS STANDS OF *CHONDHRUS*. AT INTERMEDIATE SITES, PATCHES OF *MYTILUS* OCCASIONALLY ESCAPED FROM PREDATION, SUGGESTING PREDATION INTENSITY IS PATCHY IN SPACE & TIME. PERSISTENCE OF *CHONDHRUS* IS THUS A BY-PRODUCT OF THE ACTIVITIES OF PREDATORS AT PROTECTED SITES. AT EXPOSED SITES, PREDATORS DO NOT CONTROL THE MUSSELS AS A CONSEQUENCE, *MYTILUS* OUTCOMPETES *CHONDHRUS* & *BALANUS* FOR SPACE & ACHIEVES STRUCTURAL DOMINANCE. PERIWINKLE ABUNDANCE DECREASES & ABUNDANCE & SEASONALITY OF EPHEMERAL ALGAE INCREASE WITH INCREASING WAVE SHOCK. RESULTS OF MANIPULATIONS DURING BOTH PRIMARY & SECONDARY SUCCESSION INDICATE THAT LITTORINA LITTOREA, THE ONLY LARGE.

MACKAY, A.P.
1977 NO³ GROWTH AND DEVELOPMENT OF LARVAL CHIRONOMIDAE
OIKOS. 28: 270-275.

DEVELOPMENT RATES, LENGTH-AGE GROWTH RATES & LENGTH-WEIGHT DATA RELATIONSHIPS WERE MEASURED FOR TWELVE SPECIES OF LARVAL CHIRONOMID FROM THE RIVER THAMES, UK AT 10, 15 & 20 C. FROM THESE DATA LENGTH-AGE GROWTH RATES WERE CALCULATED. THE RELATIONSHIP BETWEEN LENGTH-WEIGHT (L) & ITS LENGTH (L) WAS DESCRIBED AS A POWER FUNCTION: $L = aL^w$ ALTHOUGH THE EXPONENT B WAS FOUND TO DEPEND ON THE SIZE OF THE LARVA AT MATURATION, THE TYPE OF FOOD FED TO THE LARVA OF *ABLAESMYIA MONILIS* GREATLY EFFECTED GROWTH & DEVELOPMENT RATES. LARVAE OF *CRICOTOPUS BICINCTUS* (MEIG.) RESPONDED TO AN INCREASE OF TEMPERATURE FROM 15 TO 20 C BY AN INCREASE IN DEVELOPMENT RATE BUT NOT OF GROWTH RATE WHILST THE OTHER SPECIES STUDIED RESPONDED BY AN INCREASE IN BOTH.

MACKAY, A.P.

NO. 21
1977. QUANTITATIVE STUDIES ON THE CHIRONOMIDAE (DIPTERA) OF THE RIVERS
THAMES AND KENNET. IV PRODUCTION. ARCHEOL HYDROBIOL 80(3): 327-348.

THE PRODUCTION OF LARVAL CHIRONOMIDS IN THE RIVERS THAMES & KENNET AT READING, ENGLAND, WAS CALCULATED AS 19.4 KCAL/M² RIVER SURFACE/YEAR & 7.6 KCAL/M² RIVER SURFACE/YEAR RESPECTIVELY. DUE TO ITS LARGE SURFACE AREA THE THAMES FLINT ZONE WAS FOUND TO CONTRIBUTE MOST TO THE TOTAL PRODUCTION IN THIS RIVER BUT INTENSITY OF PRODUCTION WAS GREATEST IN THE ACORUS & NUPHAR ZONES THESE PRODUCTION ESTIMATES ARE DISCUSSED IN RELATION TO PREVIOUSLY PUBLISHED ENERGY FLOW DIAGRAMS OF THE THAMES.

MASSE, H.

1972 NO¹ QUANTITATIVE INVESTIGATIONS OF SAND-BOTTOM MACROFAUNA ALONG THE
MEDITERRANEAN NORTH-WEST COAST
MAR BIOL 15: 209-220.

CONSIDERATION OF THE RANGE OF QUANTITATIVE DATA COLLECTED IN A 4
YEAR SURVEY OF MACROBENTHIC FAUNA IN SUBLITTORAL FINESAND ON THE
NORTH-WEST MEDITERRANEAN COAST ALLOWS SOME FARREACHING COMMENTS.
ASA DIVER-OPERATED SUCTION SAMPLER WAS EMPLOYED; DENSITY &
BIOMASS VALUES OBTAINED MUST BE CONSIDERED AS THE MOST ACCURATE
ONES FOR SUCH HARD GROUND. THE WIDE RANGE OF VALUES OBSERVED
FROM BAY TO BAY & FROM YEAR TO YEAR SUGGESTS DIFFERENT CONTROLLING
FACTORS. AMONG ENVIRONMENTAL FACTORS, INFLUENCE OF EXPOSURE IS
CLEARLY SHOWN, & TROPHIC CONDITIONS OFFERED TO FILTER & SUSPENSION
FEEDERS BY THE WATER COLUMN CONTROL HIGH BIOMASS & GENERATION
IS EMPHASIZED. AMONG BIOLOGICAL FACTORS, HIGH GROWTH & GENERATION
REPLACEMENT RATES FOR MAIN SPECIES TOGETHER WITH A HIGH PREDA-
TION-RATE EXPLAIN CHANGES & INSTABILITY IN FAUNA-ASEMBLAGE
STRUCTURES OF MEDITERRANEAN FINE-SAND MACROFAUNA. COMPARISON OF
THESE BIOLOGICAL DATA WITH THOSE FROM NORTH-WEST EUROPEAN
SHALLOW-SAND ASSOCIATIONS REVEALS SOME IMPORTANT DIFFERENCES
WHICH SUGGEST SOME RESTRICTIONS TO THE PARALLEL LEVEL-BOTTOM
COMMUNITY CONCEPT.

MATHEWS, C.P.

1970 NO. 1³
ESTIMATES OF PRODUCTION WITH REFERENCE TO GENERAL SURVEYS
OIKOS. 21: 129-133.

1. THE RATIO OF PRODUCTION TO BIOMASS IS BY DEFINITION EQUAL TO THE INSTANTANEOUS GROWTH RATE IN THE USUAL ALGEBRAIC METHOD FOR PRODUCTION CALCULATION. 2. THE PRODUCTION: BIOMASS RATIO & INSTANTANEOUS GROWTH RATE WERE INDEPENDENTLY DETERMINED FOR FIVE FISH POPULATIONS & WERE COMPARABLE.³ PRODUCTION MAY BE ESTIMATED FROM BIOMASS & THE PRODUCTION: BIOMASS RATIO DETERMINED FROM GROWTH DATA ONLY. RESULTS USING THIS METHOD ARE QUITE COMPARABLE TO THOSE OBTAINED IN A MORE CONVENTIONAL WAY.⁴ THIS METHOD MAY BE PREFERABLE WHERE THERE ARE IRREGULAR SIZE/FREQUENCY CURVES, WHERE A BRIEF SURVEY IS REQUIRED, OR WHERE MANY LOW DENSITY SPECIES ARE INVOLVED.

MCCALL, P.L.

1979 NO. 38

THE EFFECTS OF DEPOSIT FEEDING OLIGOCHAETES ON PARTICLE SIZE AND
SETTLING VELOCITY OF LAKE ERIE SEDIMENTS
J SEDIMENT PETROL 49(3): 0813-0818.

SEDIMENT COLLECTED FROM THE WESTERN BASIN OF LAKE ERIE HAS A MEDIAN PARTICLE SIZE OF 1.5 MM & A MEDIAN SETTLING VELOCITY OF 0.0002 CM SEC⁻¹ MEASURED BY STANDARD SETTLING TUBE ANALYSIS. MICROSCOPIC EXAMINATION OF THIS SEDIMENT SHOWS THAT MOST OF THE PARTICLES ARE BOUND INTO LARGER CYLINDRICAL AGGREGATES BY THE FEEDING ACTIVITIES OF TUBIFICID OLIGOCHAETES (AVERAGE PELLET SIZE = 280 MM LENGTH X 70 MM DIAMETER). STANDARD SETTLING TUBE ANALYSES DESTROY OLIGOCHAETE FECAL PELLETS & MAINTAIN PARTICLES IN AN UNNATURAL DISAGGREGATED STATE. LABORATORY EXPERIMENTS & FIELD OBSERVATIONS INDICATE THAT FOR MOST OF THE YEAR THE TOP 0.5-1 CM OF WESTERN BASIN SEDIMENT IS PELLETIZED. LESS DESTRUCTIVE SETTLING VELOCITY MEASUREMENTS OF SURFACE SEDIMENTS YIELD MEDIAN VALUES OF -1 CM SEC⁻² FOR TUBIFICID FECAL PELLETS, 0.06 CM SEC⁻¹ FOR THE TOP 1 CM OF WESTERN BASIN SEDIMENT, & 0.03 CM SEC⁻¹ FOR DEGRADED FECAL PELLETS. NO REALISTIC MEASUREMENT OF THE PHYSICAL PROPERTIES OF LAKE ERIE SEDIMENTS, OF SEDIMENT EROSION & TRANSPORT, OR OF DIFFUSION RATES OF PORE WATER SOLUTES CAN BE MADE WITHOUT UNDERSTANDING THE BIOLOGICAL PROCESSES ACTIVE IN FINE GRAINED SEDIMENT.

MCINTYRE, A.D. NO. 18
1977 EFFECTS OF POLLUTION ON INSHORE BENTHOS
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 301-318

THE COASTAL REGION IS PARTICULARLY SUBJECT TO POLLUTANTS, BUT BECAUSE THEIR EFFECTS ON INSHORE BENTHOS ARE DIFFICULT TO ASSESS, BECAUSE OF THE COMPLEX NATURE OF THAT ENVIRONMENT & THE PROBLEM OF DISTINGUISHING BETWEEN NATURAL & POLLUTION-INDUCED EVENTS. THIS PROBLEM WAS APPROACHED BY A PROGRAM OF LONG-TERM EXPERIMENTS, INVOLVING BIOLOGICAL ASSAYS & FIELD OBSERVATIONS. SOME EXPERIMENTS INVOLVING A THREE-STAGE FOOD CHAIN OVER PERIODS OF SEVERAL MONTHS INDICATED THAT LOW LEVELS OF POLLUTANTS, SOMETIMES TWO ORDERS OF MAGNITUDE LESS THAN THE LC₅₀ VALUE, CAN HAVE SIGNIFICANT ADVERSE EFFECTS AT ALL TROPHIC LEVELS STUDIED. OTHER EXPERIMENTS SHOWED THAT SEA WATER FROM AN INDUSTRIALIZED REGION COULD BE LESS FAVORABLE THAN CLEAN COASTAL WATER FOR GROWTH & DEVELOPMENT OF ORGANISMS. THESE CONCLUSIONS ARE DISCUSSED IN THE LIGHT OF FIELD OBSERVATIONS ON BENTHIC COMMUNITIES, & AN ATTEMPT IS MADE TO ESTIMATE THE LEVEL OF ORGANIC INPUT WHICH WILL PRODUCE CHANGES IN SUCH COMMUNITIES.

MCNULTY, J. K., R. C. WORK AND H. B. MOORE
1962. NO. 26
SOME RELATIONSHIPS BETW. THE INFRAUNA OF THE LEVEL BOTTOM AND THE
SEDIMENT IN SOUTH FLORIDA
MAR SCI GULF CARIBBEAN BULL. 12(3): 322-332.

A STUDY OF THE LEVEL BOTTOM COMMUNITIES OF SOUTH FLORIDA IN
RELATION TO THE COARSENESSES OF THE SEDIMENT HAS LED TO CERTAIN
GENERALIZATIONS. DETRITUS FEEDERS PREDOMINATE IN THE FINEST
SEDIMENTS, AND DEPOSIT AND FILTER FEEDERS AT INTERMEDIATE GRADES,
BUT THE LATTER ARE MOST ABUNDANT AT A CONSIDERABLY GREATER
PARTICLE SIZE THAN THAT FOUND BY SANDERS IN BUZZARDS BAY. FROM A
COMPARISON OF A NUMBER OF SELECTED COMMUNITIES, THERE IS A VERY
CLOSE CORRELATION BETWEEN THE BODY SIZE OF THE DEPOSIT FEEDERS AND
THE PARTICLE SIZE, REGARDLESS OF THE TYPE OF ANIMAL CONCERNED.

MILLS, E.L.

NO. 74
1975. BENTHIC ORGANISMS AND THE STRUCTURE OF MARINE ECOSYSTEMS
J FISH RES BOARD CAN 32(9): 1654-1663

THE CONTRIBUTION OF BENTHIC ECOLOGY TO BIOLOGICAL OCEANOGRAPHY HAS BEEN RELATIVELY SLIGHT, EVEN THOUGH THE BENTHOS MAY BE CRUCIAL IN UNDERSTANDING THE DYNAMICS OF MARINE ECOSYSTEMS, AS J.H. STEEL'S MODEL OF THE NORTH SEA INDICATES. BEFORE THE BENTHOS MAY BE ACCURATELY ASSIGNED A ROLE IN SUCH MODELS, WE NEED TO KNOW AT LEAST 1) WHAT FOOD ITEMS ARE CONSUMED & ASSIMILATED, 2) WHAT THE ROLE OF BACTERIA & MEIOBENTHOS PRODUCTION IS, 3) IF THERE ARE DIFFERENT LEVELS OF DEMERSAL FISH COMMUNITIES THERE SEEM TO BE FROM DIFFERENTLY STRUCTURED BENTHIC COMMUNITIES. THEREFORE, NO SHORTCUTS TO THE KIND OF INFORMATION ABOUT BENTHIC ANIMALS USEFUL IN PERMITTING ASSESSMENT OF FISHERIES PRODUCTION IN A REALISTIC BIOLOGICAL FRAMEWORK.

MILLS, E. L.

NO. 24
1979
THE STRUCTURE AND DYNAMICS OF SHELF AND SLOPE ECOSYSTEMS
OFF THE NORTHEAST COAST OF NORTH AMERICA

IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C. PRESS: 25-47

TWO MARINE ECOSYSTEMS OFF THE COAST OF NOVA SCOTIA, CANADA ARE USED TO ILLUSTRATE THE DIFFERENCES THAT MAY RESULT FROM SPATIAL VARIATIONS IN PRIMARY PRODUCTION AND DEPTH. DEMERSAL FISH ARE THE MAIN PRODUCT OF A SHELF ECOSYSTEM CENTERED AT 90 M, WHILE PELAGIC FISH ARE PRODUCED IN A SYSTEM CENTERED AT ABOUT 320 M WHERE PRIMARY PRODUCTION IS INCREASED DUE TO STABILIZATION AND NUTRIENT ENRICHMENT AT AN OCEANIC FRONT. IN COMPARISON WITH THE NORTH SEA, PRIMARY PRODUCTION IS HIGHER IN THE NOVA SCOTIAN SYSTEMS BUT ZOOPLANKTON AND FISH PRODUCTION ARE CONSIDERABLY LOWER. A MAJOR DIFFICULTY IN DELINEATING PLAUSIBLE QUANTITATIVE FOOD WEBS OFF NOVA SCOTIA IS THE PROBLEM OF PROVIDING SUFFICIENT ENERGY TO THE PELAGIC COMPONENTS IF THE BENTHIC COMPONENTS HAVE REALISTIC VALUES. THIS IS THE RESULT OF A SERIES OF UNCERTAINTIES ABOUT THE AMOUNT OF PRIMARY PRODUCTION, THE IMPORTANCE OF MICROZOOPLANKTON AND GELATINOUS HERBIVORES, THE TURNOVER OF MACROZOOPLANKTON, THE FOOD REQUIREMENTS OF THE FISH, AND THE PROPER TRANSFER EFFICIENCIES. ON THE BENTHIC SIDE THERE ARE PROBLEMS IN ESTIMATING THE AMOUNT AND KIND OF FOOD REACHING THE BOTTOM; IN ASSESSING THE IMPORTANCE OF BACTERIA AS FOOD; IN DETERMINING RELATIONSHIPS OF MACROFAUNA, MEIOFAUNA, NONBACTERIAL MICROFAUNA, AND BACTERIA; AND IN ASSIGNING TURNOVER RATES TO ALL COMPONENTS. COMPARING THE NOVA SCOTIAN FISH PRODUCTION SYSTEMS TO THOSE OFF THE EAST COAST OF THE UNITED STATES, THERE ARE INDICATIONS THAT LESS PRIMARY PRODUCTION IS AVAILABLE TO THE NON-FISH ELEMENTS OF THE NOVA SCOTTIAN SYSTEMS THAN FARTHER SOUTH. IF SO, FOOD WEBS ARE LIKELY TO BE LESS COMPLEX OFF NOVA SCOTIA THAN IN THE MORE SOUTHERN ECOSYSTEMS, OR TRANSFER EFFICIENCIES MAY BE HIGHER.

MOORE, D. M.

NO. 86
1978. SEASONAL CHANGES IN DISTRIBUTION OF INTERTIDAL MACROFAUNA IN THE
LOWER MERSEY ESTUARY, U.K.; SCI 7: 117-125

THE DISTRIBUTION OF INTERTIDAL MACROFAUNA ON THE EAST SHORE OF THE MERSEY ESTUARY CHANGES FROM SEASON TO SEASON. PRINCIPAL COMPONENTS ANALYSIS IDENTIFIED A FAUNAL GRADIENT IN WINTER WHICH IS ORIENTED PARTLY LONG-SHORE & PARTLY DOWN-SHORE. THIS PATTERN IS SIMPLIFIED IN SPRING & SUMMER WHEN DISTRIBUTION IS GRADED EVERYWHERE PERPENDICULAR TO THE SHORE BUT THIS BREAKS DOWN IN AUTUMN WITH THE RETURN OF A LONG-SHORE GRADIENT. THE CONTINUAL RE-ADJUSTMENT OF THE INTERTIDAL COMMUNITY IS RELATED TO THE SEASONAL CHANGES IN THE PROPORTION OF VERY FINE SAND & MUD. THE PHYSICAL PROPERTIES OF THE ESTUARY WHICH DETERMINE TURBIDITY & SEDIMENTATION ON THE EAST SHORE ARE DISCUSSED WITH REGARD PARTICULARLY TO ORGANIC POLLUTION ASSOCIATED WITH THE SEDIMENTS.

MOUNTFORD, N.K., A.F. HOLLAND AND J.A. MIHURSKY
NO. 05
1977 IDENTIFICATION AND DESCRIPTION OF MACROBENTHIC COMMUNITIES IN THE
CALVERT CLIFFS REGION OF THE CHESAPEAKE BAY
CHESAPEAKE SCI 18(4): 360-369

THE MACROBENTHOS (>1.0 MM) IN THE CALVERT CLIFFS REGION OF THE
CHESAPEAKE BAY WERE SAMPLED OVER A THREE YEAR PERIOD (1971-1974)
FOUR DISTINCT COMMUNITIES (SHELL, 3-M SAND, 6 M MUDDY-SAND, 9
M MUD) WERE IDENTIFIED & DESCRIBED USING SINGLE-LINKAGE CLUSTER
& DISCRIMINANT ANALYSES. SUBSTRATE CHARACTERISTICS WERE THE MAJOR
ENVIRONMENTAL FACTOR CONTROLLING THE SPATIAL DISTRIBUTION OF
MACROBENTHIC COMMUNITIES WITHIN THE STUDY AREA, & WITHIN A
HABITAT COMMUNITIES WERE RELATIVELY HOMOGENEOUS THROUGHOUT THE
REGION. THE STRUCTURE OF THE 6 M MUDDY-SAND COMMUNITY VARIOUSLY
RESEMBLED THE 3-M SAND OR THE 9-M MUD COMMUNITY DEPENDING UPON
SEASON & YEAR.

MYERS, A. C.

1977 NO. 42
SEDIMENT PROCESSING IN A MARINE SUBTIDAL SANDY BOTTOM COMMUNITY:
I. PHYSICAL ASPECTS
J. MAR RES 35(3): 609-647.

SEDIMENT PROCESSING BY ANIMALS MAY INCLUDE BURROWING, INGESTION/DEFECATION, TUBE-BUILDING, & BIODEPOSITION. IN A BENTHIC COMMUNITY COMBINATIONS OF THESE PROCESSES WILL OCCUR. THEIR PROPORTIONS & RELATIVE IMPORTANCE DEPENDING ON THE COMPOSITION OF THE FAUNA & THE SEDIMENTARY ENVIRONMENT. ALTHOUGH THE VARIOUS KINDS OF SEDIMENT PROCESSING & THE EFFECTS OF EACH HAVE BEEN STUDIED, THERE HAVE BEEN NO STUDIES OF A COMMUNITY: WHAT EACH PROCESS CONTRIBUTES & HOW THE SEPARATE PROCESSES INTEGRATE. YET AN UNDERSTANDING OF BIOLOGICALLY-MEDIATED SEDIMENT-WATER INTERACTIONS MUST INCLUDE AN UNDERSTANDING OF DAILY FIELD STUDIES, INCLUDING WEEKLY QUANTITATIVE SAMPLES OF THE INFAUNA, SEDIMENT TEMPERATURE & SALINITY, WERE MADE AT A SINGLE SITE IN THE WEST BASIN OF CHARLESTOWN POND, A RHODE ISLAND COASTAL LAGOON, BETWEEN JULY 1969 & AUGUST, 1970. LABORATORY EXPERIMENTS DETERMINED THE MODE OF BURROWING, FORM OF BURROW, & SEDIMENT REWORKING CHARACTERISTICS OF THE HOLOTHURIAN *LEPTOSYNAPTA TENUIS* & THE POLYCHAETE *SCOLOPLOS ROBUSTUS*. THE EFFECTS EACH OF THESE ANIMALS HAD ON THE COMPACTNESS OF THE SEDIMENT WERE MEASURED WITH A ROTATIONAL VISCOMETER. TUBE-BUILDING SITES WERE ALSO EXAMINED. OBSERVATIONS RESULTED IN A STUDY PROCESSING BUDGET. INGESTION/DEFECATION BY THE HOLOTHURIAN *LEPTOSYNAPTA TENUIS* DOMINATED SEDIMENT PROCESSING AT THE STUDY SITE, FOLLOWED BY BURROWING & TUBE-BUILDING. BIODEPOSITION WAS QUANTITATIVELY INSIGNIFICANT. TUBE-BUILDING DOMINATED THE SEDIMENT SURFACE FOR A SHORT PERIOD DURING THE SUMMER WHEN THE AMPHIPOD *COROPHİUM INSIDIOSUM* INVADED THE STUDY AREA. THIS WAS ACCOMPANIED BY A TEMPORARY INCREASE IN NEAR-SURFACE BURROWING ACTIVITY BY SMALL ANIMALS TAKING ADVANTAGE OF THE TUBE-ROUGHENED SEDIMENT SURFACE. REWORKING & DEEP-BURROWING BOTH EXTENDED THE DEPTH OF THE SURFACE OXIDIZED SEDIMENT LAYER & CREATE OXIDIZED MICROENVIRONMENTS BELOW THE OXIDIZED ZONE IN THE IMMEDIATE VICINITY OF BURROWS.

NELSON, W. G.
1979 NO. 43
AN ANALYSIS OF STRUCTURAL PATTERN IN AN EELGRASS (ZOSTERA
MARINA L.) AMPHIPOD COMMUNITY
J EXP MAR BIOL ECOL 39: 231-264.

THE AMPHIPODS OF EELGRASS (*ZOSTERA MARINA* L.) HABITATS NEAR THE BEAUFORT, & SPATIAL PATTERNS OF ABUNDANCE & DIVERSITY OF AMPHIPODS; 2) EVALUATING THE HYPOTHESIS THAT COMPETITION AMONG AMPHIPOD PATTERNS, & 3) EXAMINING THE HYPOTHESIS THAT AMPHIPOD COMMUNITY DIVERSITY, FOUR MEASURES OF AMPHIPOD DIVERSITY STRUCTURE (H_d), & EVENNESS (J) - NUMBER OF SPECIES PER SAMPLE, DIVERSITY, & SEASONAL PATTERNS. THESE MEASURES ARE SHOWN TO BE SIMILAR DURING THE LATE WINTER & DECREASE SHARPLY DURING THE SPRING MONTHS TO SUMMER LOWS. THERE ARE INCREASES IN ALL OF THEM IN THE FALL. SEASONAL PATTERNS ARE GENERALLY SIMILAR FROM YEAR TO YEAR & ARE SOMEWHAT SIMILAR WITHIN A SINGLE YEAR AT TWO STUDY SITES LOCATED IN DIFFERENT AREAS OF THE ESTUARINE SYSTEM. PREDATOR INCLUSION EXPERIMENTS USING THE PINFISH LAGODON RHOMBOIDES (L.) WERE SUCCESSFUL IN GENERATING SIGNIFICANT REDUCTIONS IN AMPHIPOD ABUNDANCES FOLLOWING THE TWO-WEEK DURATION OF THE EXPERIMENT. ON THE OTHER HAND, FISH EXCLUSION EXPERIMENTS WERE MOSTLY UNSUCCESSFUL AT GENERATING SIGNIFICANT INCREASES IN AMPHIPOD DENSITY & SPECIES DIVERSITY AS COMPARED WITH UNCAGED CONTROLS. DUE TO AN INCREASED ACTIVITY OF DECAPOD PREDATORS, THREE WAYS: 1) THE MATRIX OF PRODUCT-MOMENT CORRELATION COEFFICIENTS WAS GENERATED FOR ALL COMMON SPECIES FROM ALL AVAILABLE DATA & WAS EXAMINED FOR SIGNIFICANT NEGATIVE VALUES, 2) GUT CONTENTS OF FIVE COMMON SPECIES WERE EXAMINED FOR FOOD OVERLAP, & 3) LABORATORY COMPETITION EXPERIMENTS WERE CARRIED OUT WITH THREE OF THE MORE COMMON AMPHIPOD SPECIES. EVIDENCE FOR COMPETITION WAS SLIGHT; IN THE AMPHIPOD ASSEMBLAGE STUDIED, THERE IS NO COMPETITIVE DOMINANT WHICH MONOPOLIZES FOOD OR SPACE AT HIGH DENSITIES. INCREASED PREDATION PRESSURE RESULTS IN A PATTERN OF MONOTONIC DECREASE IN ABUNDANCE & DIVERSITY REMOVAL OF ONE LEVEL OF PREDATOR (FISH) IN THIS SYSTEM APPEARS TO RESULT IN INCREASES IN OTHER PREDATORY LEVELS (DECAPOD CRUSTACEANS). THUS CONTINUING

NESTLER, J. M.

NO. 30
1980:
NICHE RELATIONSHIPS OF THE ANISOPTERA NYMPHS OF LAKE ISAQUEENA
PHD DISSERTATION.

THE PURPOSE OF THIS WORK IS TO INVESTIGATE SEVERAL COMMUNITIES & TO ELUCIDATE POSSIBLE STRUCTURING MECHANISMS WITH THE GOAL OF ABSTRACTING GENERAL PROPERTIES THAT CAN BE APPLIED TO BETTER UNDERSTAND NATURAL COMMUNITIES. I INFER ECOLOGICAL RELATIONSHIPS ON THE BASIS OF EXTERNAL MORPHOLOGY FOR 18 SPECIES OF ANISOPTERA (ODONATA) NYMPHS DISTRIBUTED ACROSS FIVE DIFFERENT COMMUNITIES. THE STUDY DISTILLS INTO TWO PORTIONS. THE FIRST INVOLVES SUBSTANTIATING POSTULATED CORRELATIONS BETWEEN MORPHOLOGY & FUNCTION THROUGH OBSERVATION, LITERATURE CITATION & EXPERIMENTATION. I THEN FORMULATE INDICES FROM MORPHOLOGICAL FEATURES WHICH ESTIMATE NICHES & HABITAT PARAMETERS, CREATING NICHE "PROFILES" WHICH DESCRIBES BOTH RELATIONSHIPS BETWEEN SPECIES & WITH THE ABIOTIC ENVIRONMENT. I REACH THE FOLLOWING CONCLUSIONS. FIRST, THE TROPHIC POSITION OF DRAGONFLY NYMPHS IN DIFFERENT COMMUNITIES IS EXTREMELY VARIABLE. SECOND, DRAGONFLY ASSEMBLAGES ARE STRUCTURED ON THE BASIS OF ENVIRONMENTAL FLUCTUATIONS & GUILD MEMBERSHIP. THIRD, COMMUNITY RELATIONSHIPS, AT LEAST IN THIS CASE, ARE NOT ELUCIDATED BY SPLITTING NICHE AXES BUT RATHER BY COLLAPSING & SIMPLIFYING THE NICHE & HABITAT AXES OF THE COMPONENT SPECIES.

NICHOLS, F.H.
1975. NO. 03
DYNAMICS AND ENERGETICS OF THREE DEPOSIT FEEDING BENTHIC
INVERTEBRATE POPULATIONS IN PUGET SOUND WASHINGTON
ECOL MONOGR 45: 57-82

THE DYNAMICS & ENERGETICS OF SUBPOPULATIONS OF POLYCHAETE SPECIES, PECTINARIA CALIFORNIENSIS HARTMAN, WERE STUDIED & COMPARED WITH CRUDE DETERMINATIONS OF THE SAME FOR THE LARGER BUT RARER COEXISTING SPECIES OF THE SAME FEEDING MODE. THE HEART URCHIN BRISASIER LATIFRONS (AGASSIZ) & THE SEA CUCUMBER MOLPADIA INTERMEDIA (CLUDWIG) MONTHLY SAMPLES, TAKEN FOR 1 YR AT FIVE STATIONS IN PUGET SOUND REPRESENTING DIFFERENT HABITATS, WERE USED IN CONJUNCTION WITH LABORATORY MEASUREMENTS OF RESPIRATION TO ASSESS THE EFFECTS OF SEASONAL & SPATIAL VARIATION IN GROWTH, MORTALITY, & RESPIRATION ON ESTIMATES OF ENERGY FLOWN THROUGH THESE SPECIES POPULATIONS. PECTINARIA LARVAL SETTLEMENT (2,900-24,000 INDIVIDUALS/M²) OCCURRED AT ALL LOCATIONS IN JUNE 1970. TWO TO THREE AGE CLASSES OF COHORTS WERE PRESENT SIMULTANEOUSLY: PECTINARIA REPRESENTED 4% - 26% OF MACROFAUNA (> 1 MM) BIOMASS, & 9% - 47% OF NUMBERS AT FIVE LOCATIONS, BASED ON THE MEAN OF FOUR SEASONAL ESTIMATES. AT THE TWO STATIONS WHERE BRISASIER & MOLPADIA COEXISTED WITH PECTINARIA THEY CONTRIBUTED, RESPECTIVELY, 79% & 4% OF MACROFAUNAL BIOMASS AT ONE STATION & 13% & 63% AT THE OTHER. RECRUITMENT & GROWTH OF THE TWO ECHINOEDERS APPEARED NEGLIGIBLE AS NEITHER NUMBERS NOR MEAN SIZE CHANGED DURING THE STUDY PERIOD. ANNUAL PRODUCTION OF PECTINARIA, NOT INCLUDING EXCRETION OR MUCUS PRODUCTION, VARIED 1.4-4.8 G C/M²·YR (14-49 KCAL/M²·YR). THE RATIO OF ANNUAL PRODUCTION TO MEAN ANNUAL BIOMASS, VARYING IN THE STUDY AREA 3.3-5.5, PROVIDED A BETTER ESTIMATE OF TURNOVER THAN THE MORE COMMONLY USED RATIO BASED ON THE LIFETIME OF A COHORT BECAUSE OF THE DIFFICULTY OF DETERMINING LIFESPAN. A PROBLEM WITH MOST LONG-LIVED ORGANISMS, PECTINARIA CONTRIBUTED 14%-42% OF MACROFAUNAL RESPIRATION IN THE AREA STUDIED. BUT THESE NUMBERS WERE SHOWN TO BE UNREALISTICALLY HIGH BECAUSE OF THE FAILURE TO REPRODUCE IN THE LABORATORY IN-SITU OXYGEN-TENSION CONDITIONS. SUCH OVERESTIMATES OF POPULATION RESPIRATION FROM LABORATORY MEASUREMENTS WERE MOST MARKED FOR BRISASIER & MOLPADIA. THESE LATTER ESTIMATES, WHILE REFLECTING BIOMASS DATA,

OSMAN, R.W.
1977 NO. 89
ESTABLISHMENT AND DEVELOPMENT OF A MARINE EPIFAUNAL COMMUNITY
ECOL MONOGR 47: 37-63

BECAUSE OF THE NATURE OF THEIR SUBSTRATUM, THE SESSILE INVERT
EBRATE SPECIES OF THE MARINE EPIFAUNAL COMMUNITY LIVING ON ROCKS
OCCUR IN DISCRETE PATTERNS OF DISTRIBUTION. THE ROCKS ARE FINITE &
PATCHES OR HABITAT ISLANDS WITH A LIMITED SPACE FOR COLONIZATION &
GROWTH. SUCH A SYSTEM IS IDEAL FOR STUDYING THE PARAMETERS ALSO,
AFFECTING THE DISTRIBUTION OF SPECIES WITHIN A COMMUNITY. ALSO,
BECAUSE OF THE SMALL SIZE & IMMOBILITY OF THE ADULTS, THE SYSTEM
IS ALSO IDEAL FOR STUDYING THE PATTERN OF CHANGE IN SPECIES
COMPOSITION & DIVERSITY WITHIN A COMMUNITY. THIS STUDY USED
MULTIPLE SERIES OF MANIPULATED EXPERIMENTAL PLATES, WHICH BOTH
DUPLICATED NATURAL ROCK SURFACES & COULD BE COMPARED WITH SAMPLES
OF THE ROCKS, TO INVESTIGATE THE DEVELOPMENTAL & DISTRIBUTIONAL
PROCESSES OF THIS COMMUNITY. FIVE MAJOR FACTORS WERE FOUND TO BE
IMPORTANT TO BOTH THE DEVELOPMENT OF THE COMMUNITY & ITS
DISTRIBUTION ON THE ROCKS: (1) THE SELECTIVITY OF THE METAMOR
PHOSING LARVAE AS TO SITE OF ATTACHMENT; (2) THE SEASONAL
FLUCTUATION IN LARVAL ABUNDANCES; (3) THE BIOLOGICAL INTERACTIONS
WITHIN & BETWEEN SPECIES; (4) THE SIZE OF ROCK SUBSTRATA; & (5)
THE PHYSICAL DISTURBANCE OF THE SUBSTRATA (ROCK TURNOVER).
INITIALLY, THE DEVELOPMENTAL PROCESSES CAN BE UNCOUPLED FROM THE
EFFECTS OF SUBSTRATE SIZE & DISTURBANCE. PREDATION IS RELATIVELY
UNIMPORTANT AS A BIOLOGICAL INTERACTION. WITHIN THIS COMMUNITY, BUT
THE SPECIES CAN BE RANKED ACCORDING TO THEIR ABILITY TO COMPETE
FOR THE AVAILABLE SPACE ON A SUBSTRATUM. THIS RANKING IMPLIES A
TYPE OF SUCCESSIONAL SEQUENCE IN THE DEVELOPMENT OF THE COMMUNITY;
HOWEVER, THE SEQUENCE IS GREATLY AFFECTED BY HISTORICAL COMPONENTS.
THE COLONIZATION OF A SUBSTRATUM IS DIRECTLY DEPENDENT UPON THE
ABUNDANCE OF SETTLING LARVAE, WHICH IN TURN IS A FUNCTION OF
SEASONALITY & SELECTIVITY. THE EVENTUAL COMPETITIVE OUTCOME &
DEVELOPMENT OF THE COMMUNITY WILL DEPEND UPON WHICH SPECIES HAVE
IMMIGRATED ONTO THE SUBSTRATUM & IS THUS DEPENDENT UPON HISTORY.
THE PROCESS IS, THEREFORE, OPEN ENDED: COLONIZATION WILL BE
HIGHLY VARIABLE & CHANGE SEASONALLY & ALTHOUGH ONE SPECIES MAY
EVENTUALLY DOMINATE THE SUBSTRATUM, IT MAY BE ONE OF NINE

PETERSON, C.H. AND N.M. PETERSON
1979 NO. 31
THE ECOLOGY OF INTERTIDAL FLATS OF NORTH CAROLINA: A COMMUNITY
PROFILE
BIOLOGICAL SERVICES PROGRAM, NOVEMBER, U.S.F.W.S., DEPT. INTERIOR.

OUR TEXT IS ORGANIZED ON A TAXONOMIC & A FUNCTIONAL BASIS. AFTER AN INTRODUCTORY DESCRIPTION OF THE PHYSICAL ENVIRONMENT OF THE INTERTIDAL SOFT-SEDIMENT HABITAT (CHAPTER 1), WE DESCRIBE THE PLANTS, THE PRIMARY PRODUCERS OF MOST MARINE SYSTEMS (CHAPTER 2). IN SUCCEEDING CHAPTERS WE DISCUSS THE BENTHIC INFRAUNA & THE MOBILE EPIBENTHIC INVERTEBRATES (CHAPTER 3), THE FISHES (CHAPTER 4), & THE BIRDS (CHAPTER 5). THIS PROGRESSION IS CLEARLY TAXONOMIC, BUT TO A GREAT EXTENT IT IS ALSO FUNCTIONAL, REFLECTING THE MAJOR PATHWAYS OF ENERGY FLOW THROUGH THE INTERTIDAL SYSTEM. THE BENTHIC INFRAUNA ARE LARGELY HERBIVOROUS OR DETRITIVOROUS & FORM THE PREY OF THE MOBILE EPIBENTHIC INVERTEBRATES. BOTTOM-FEEDING FISHES & SHOREBIRDS FEED EXTENSIVELY ON THESE MOBILE INVERTEBRATES AS WELL AS ON THE BENTHIC INFRAUNA. SOME OF THE FISHES FALL VICTIM TO WADING OR DIVING BIRDS. CONSEQUENTLY, OUR PROGRESSION OF CHAPTERS ROUGHLY CORRESPONDS TO THE FLOW OF ENERGY UP THE FOOD CHAIN OF A COASTAL FLAT. IN OUR FINAL CHAPTER (6), WE ADDRESS SOME SPECIFIC APPLIED PROBLEMS THAT EMERGE IN MANAGING MAN'S ACTIVITIES IN THE VICINITY OF INTERTIDAL FLATS.

PFANNKUCHE, O.

1979 NO. 10
ABUNDANCE AND LIFE CYCLE OF LITTORAL MARINE AND BRACKISH-WATER
TUBIFICIDAE AND NAIDIIDAE (OLIGOCHAETA)
CYCLIC PHENOMENA IN MAR. PLANTS, ANIMALS, PERGAMON PRESS, OXFORD, N.Y.

MARINE OLIGOCHAETA OCCUR FROM THE SUPRALITTORAL DOWN TO ABYSSAL DEPTHS, ESPECIALLY IN THE HIGHLY EUTROPHIC & PRODUCTIVE LITTORAL ZONE. OLIGOCHAETES CAN BE DOMINANT BOTH IN ABUNDANCE & BIOMASS. IN THIS PAPER, DATA ARE SUBMITTED ON THE ABUNDANCE, LIFE CYCLES & REPRODUCTIVE BEHAVIOURS OF THE MOST COMMON TUBIFICID SPECIES FROM EUROPEAN BOREAL SHORES: *TUBIFEX COSTATUS*, *TUBIFEX PSEUDOGASTER* & *PELOSCOLEX BENEDENI* & OF THE NAIDIID POPULATIONS REMAINS OF THE TUBIFICID POPULATIONS AFTER TWO CHAETA SANNO. ABUNDANCE OF THE TUBIFEX ARE PRODUCED BY CONSIDERABLE RELATIVELY CONSTANT DURING THE YEAR. THEY ARE CHARACTERIZED BY YEARS OF LIFE NAIDIID POPULATIONS COMPARED WITH ASEXUAL REPRODUCTION FLUCTUATION IN ABUNDANCE COMPARED WITH A MINOR ROLE. P. ANNUAL (PARATOMIE), SEXUAL REPRODUCTION PLAYS A MINOR ROLE. P. LITTORALIS ATTAINS HIGHEST ABUNDANCE IN SUMMER. A. SANNO DEVELOPS MAXIMA OF ABUNDANCE IN EARLY SPRING & AUTUMN WHICH CAN BE CORRELATED TO FOOD SUPPLY.

PORTER, R. S. NO. 53
1974. REPRODUCTIVE CYCLE OF THE SOFT-SHELL CLAM, *MYA ARENARIA*, AT SKAGIT
BAY, WASHINGTON
FISH BULL 72(3): 648-656.

THE ANNUAL REPRODUCTIVE CYCLE OF THE SOFT-SHELL CLAM, *MYA ARENARIA*
WAS STUDIED AT SKAGIT BAY IN NORTHERN PUGET SOUND, WASH. BOTH 1971 &
SPAWNING OCCURRED FROM LATE MAY TO EARLY SEPTEMBER IN BOTH 1971 &
1972 WITH PEAK SPawning IN JULY & JUNE RESPECTIVELY. SMALL CLAMS
(LESS THAN 60 MM IN LENGTH) HAD A SPAwNING PEAK THAT COINCIDED
WITH OTHER SIZE CLASSES ALTHOUGH THE SPAwNING PERIOD WAS SHORTER
IN DURATION. THE SINGLE YEARLY SPAwNING PERIOD AT SKAGIT BAY
CORRESPONDS WITH EAST COAST POPULATIONS IN CANADA & MAINE.

RACHOR, E.

1976. NO. 8. STRUCTURE, DYNAMICS AND PRODUCTIVITY OF A POPULATION OF NUCULA
NITIDOSA (BIVALVIA, PROTOBRANCHIA) IN THE GERMAN BIGHT
BER D T WISS KOMMEN MEERESFORSCH 24: 296-331.

A POPULATION OF THE BIVALVE NUCULA NITIDOSA OF A SUBLITTORAL MUDDY AREA IN THE GERMAN BIGHT WAS STUDIED FROM 1969 TO 1974. N. NITIDOSA LIVE BENEATH THE SEDIMENT SURFACE & IS DISPERSED PATCHILY SPAWNING OCCURS FROM LATE SUMMER TO SPRING; GROWTH IN LENGTH OF YOUNG ANIMALS IS MORE THAN 3.5 MM PER YEAR & LESS THAN 1 MM IN OLDER SPECIMENS. ABUNDANCE DECREASED DURING THE INVESTIGATION PERIOD FROM ABOUT 1000 IND. PER M² TO RELATIVELY STABLE FIGURES OF ABOUT 200 IND. PER M². ANNUAL TURNOVER RATE IN TERMS OF DRY MASS WAS ABOUT 1.4 AT A MEAN STANDING STOCK BIOMASS OF 1.3 G PER M² WITH THE SHARE OF GONAD OUTPUT BEING VERY HIGH (66% IN TERMS OF PRODUCED ENERGY). THE POPULATION STUDIED IS SUPPOSED TO LIVE UNDER SUB-OPTIMAL CONDITIONS.

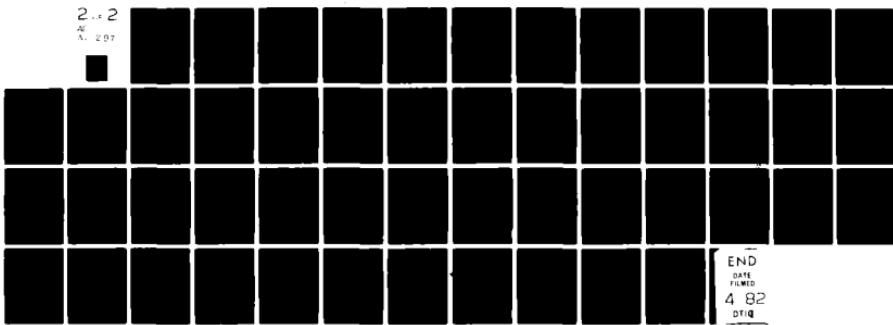
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ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG--ETC F/8 8/1
ANIMAL SUBSTRATE RELATIONSHIPS AND PRODUCTIVITY OF INVERTEBRATE--ETC(U)
DEC 81 J D LUNZ, H L HORSTMANN

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RACHOR, E. AND H. SALZWEDEL
NO. 95
STUDIES ON POPULATION DYNAMICS AND PRODUCTIVITY OF SOME BIVALVES
IN THE GERMAN BIGHT
10TH EUROPEAN SYMPOSIUM. MARINE BIOLOGY, OSTEND, BELGIUM, 2: 575-588

IN THE COURSE OF LONG-TERM INVESTIGATIONS ON VARIATIONS & PRODUCTIVITY OF SUBLITTORAL BENTHIC MACROFAUNA IN THE GERMAN BIGHT SEVERAL BIVALVE SPECIES HAVE BEEN INVESTIGATED SINCE 1969. REPORT IS GIVEN ABOUT ANNUAL VARIATIONS & ABOUT THE LONG-TERM DEVELOPMENT IN NUMERICAL ABUNDANCE. THE SPECIES *NUCULA NITIDOSA*, *TELLINA FABULATA* & *CULTELLUS PELLUCIDUS* HAVE BEEN STUDIED MORE INTENSIVELY. *C. PELLUCIDUS* & *T. FABULATA* WERE FOUND TO BREED IN SUMMER WITH THE BREEDING SEASON OF THE LATTER SPECIES BEING MORE PROLONGED. THE REPRODUCTION OF *N. NITIDOSA* STARTS IN LATE SUMMER LASTING TILL SPRING. LARGE ANIMALS OF *C. PELLUCIDUS* (30 MM LENGTH) & *T. FABULATA* (20 MM) ARE SUPPOSED TO BE 2-3 YRS OLD, WHEREAS *NUCULA* SPECIMENS OF 9 MM LENGTH ARE ABOUT 5 YEARS OLD. DATA ON GROWTH ARE PRESENTED. THE PRODUCTIVITY OF *N. NITIDOSA* WAS CALCULATED WITH THE ANNUAL P:B RATIO (TURNOVER-RATE) BEING ABOUT 1.5 AT A STANDING STOCK BIOMASS OF 1.3 G DRY TISSUE WT./M².

READING, C.J. AND S. MCGORTY
NO. 10 IN THE BURYING DEPTH OF *MACOMA BALTHICA* AND
1978 SEASONAL VARIATIONS IN THE BURYING DEPTH OF *MACOMA BALTHICA*
ITS ACCESSIBILITY TO WADING BIRDS
ESTUARINE COASTAL MAR SCI 6: 135-144

THE SEASONAL RELATIONSHIP BETWEEN SHELL LENGTH & DEPTH BURIED IN
MACOMA BALTHICA (L.) WAS STUDIED ON AN AREA OF INTERTIDAL FLAT IN
THE WASH. ALTHOUGH THE LARGER ANIMALS BURIED DEEPER THAN THE
SMALLER ONES (0.28%) OCCURRED BELOW A DEPTH OF 7.5 CM.
THE STUDY SHOWED THAT *M. BALTHICA* MIGRATED WITHIN THE SUBSTRATE
APPARENTLY IN RESPONSE TO DAY LENGTH, SO THAT THEY WERE NEAREST
THE SURFACE IN JUNE & BURIED DEEPEST IN DECEMBER. THE MAXIMUM
DEPTH BURIED, IN DECEMBER, BY AN ANIMAL WAS FOUND TO BE
PROPORTIONAL TO THE LENGTH OF ITS INHALANT SIPHON. DURING DECEMBER
THE ACCESSIBILITY OF *M. BALTHICA* TO KNOT (*CALIDRIS CANUTUS* (L.))
WAS REDUCED TO 4% OF THE TOTAL BIOMASS.

REES, C. P.

ND. 83
LIFE CYCLE OF THE AMPHIPOD GAMMARUS PALUSTRIS BOUSFIELD
ESTUARINE COASTAL MAR SCI 3: 413-419.

TO ELUCIDATE THE LIFE CYCLE OF THE AMPHIPOD GAMMARUS PALUSTRIS BOUSFIELD, A SECTION OF THE INTERTIDAL ZONE OF A SALT MARSH ALONG THE LOWER PATUXENT RIVER, MARYLAND, WAS SAMPLED FROM JANUARY 1972 TO DECEMBER 1973. MONTHLY COLLECTIONS REVEALED A GRADUAL (IF FLUCTUATING) INCREASE IN ABUNDANCE FROM MARCH TO OCTOBER, AFTER WHICH NUMBERS DECLINED REACHING A LOW IN THE MIDWINTER MONTHS. THE BREEDING SEASON EXTENDED FROM FEBRUARY TO OCTOBER WITH MAJOR PEAKS OF ACTIVITY OCCURRING IN MARCH & AUGUST-SEPTEMBER. WHEREAS THE SPRING PEAK WAS PRODUCED BY THE OVER-WINTERING GENERATION, THE LATE SUMMER PEAK WAS A PRODUCT OF THE SUMMER GENERATION. THE OVER-WINTERING GENERATION FIRST REVERSED EGG PRODUCTION IN FEBRUARY & THE FIRST YOUNG APPEARED IN MARCH. THESE YOUNG MATURED DURING LATE MAY TO LATE JUNE. THE OVER-WINTERING GENERATION BEGAN TO DIE-OUT IN APRIL DISAPPEARING COMPLETELY BY EARLY JULY WHILE THE SUMMER GENERATION CONTINUED PRODUCING THROUGH JULY, AUGUST & SEPTEMBER. FINALLY, IT IS SURMISED THAT THE INITIAL BROOD(S) OF THE SUMMER GENERATION FEMALES HAVE SUFFICIENT TIME TO MATURE & REPRODUCE BEFORE THE END OF THE SUMMER.

REINECK, H. E., AND I. B. SINGH
1973. NO. 39
DEPOSITIONAL SEDIMENTARY ENVIRONMENTS, WITH REFERENCE TO
TERRIGENOUS CLASTICS.
SPRINGER-VERLAG, NEW YORK, HEIDELBERG, BERLIN: 114-133

THIS PUBLICATION DEFINES SEDIMENT GRAIN PARAMETERS AND DISCUSSES
THE NONBIOLOGICAL CONDITIONS OF THE DEPOSITION OF ENVIRONMENT
AFFECTING THOSE PARAMETERS.

REISE, K.

NO. 07
1979
SPACIAL CONFIGURATIONS GENERATED BY MOTILE BENTHIC POLYCHAETES
HELGOLANDER WISS MEERESUNTERS.

MICRO-SPATIAL PATTERNS OF FIVE INFAUNAL POLYCHAETE SPECIES WERE INVESTIGATED ON TIDAL FLATS IN THE WADDEN SEA (ISLAND OF SYLT, NORTH SEA). SEDIMENT SAMPLES WERE TAKEN WITHIN PLOTS OF 4 M² AT REGULAR DISTANCES OR WITH A MULTIPLE-CELL CORER COMPOSED OF 144 CONTIGUOUS UNITS. MOST OF THE CONFIGURATIONS OBSERVED CAN BE RELATED TO THE MODE OF FEEDING. INDIVIDUALS OF THE PREDATORY POLYCHAETE *ETEONE LONGA* DO NOT GENERATE DISCERNIBLE SPATIAL STRUCTURES. ANAIIDES *MUCOSA*, A CARNIVOROUS SCAVANGER, OCCURS IN MARKED PATCHES. JUVENILE SCOLOPOLEIDS *ARMIGER*, A BURROWING DEPOSIT FEEDER, LIVE IN SMALL AGGREGATES WHICH, IN TURN, CONGLOMERATE TO LARGER ONES. ADULTS ARE SCATTERED WITHIN LARGER CLUSTERS. HIGH DENSITY AREAS OF JUVENILES & ADULTS DO OVERLAP. ANOTHER BURROWING DEPOSITOR, *CAPITELLA CAPITATA*, IS EVEN MORE AGGREGATED. LOCAL ATTRACTORS MAY CAUSE CLUSTERS OF EXCEPTUAL INTENSITY. TERRITORIALITY IS EXHIBITED BY THE TUBE-DWELLING SURFACE DEPOSIT FEEDING NEREIS DIVERSICOLOR. THE JUVENILES ARE RESTRICTED TO INTERSPACES LEFT BY THE ADULTS.

REISE, K. AND P. AX
1979 NO. 64
A MEIOFAUNAL "THIOBIOS" LIMITED TO THE ANAEROBIC SULFIDE SYSTEM OF
MARINE SAND DOES NOT EXIST
MAR BIOL: 225-237.

THE SPATIAL RELATIONSHIP OF INTERSTITIAL METAZOANS TO SOURCES OF OXYGEN HAS BEEN STUDIED ON A TIDAL FLAT IN THE WADDEN SEA NEAR SYLT (EASTERN PART OF THE NORTH SEA). CONSISTENTLY, MEIOFAUNA REMAINS IN CLOSE PROXIMITY TO OXYGENATED LAYERS OR POCKET AREAS WITHIN THE SEDIMENT. THIS IS EXEMPLIFIED BY THE PATTERN OF MEIOFAUNAL ABUNDANCE & SPECIES COMPOSITION ALONGSIDE OXIC BURROWS OF THE LUGWORM *ARENICOLA MARINA*. A SPECIFIC MEIOFAUNA CONFINED TO OXYGEN-DEFICIENT HORIZONS OF THE SEDIMENT DOES NOT EXIST.

RHOADS, D.C.

1974. NO. 30
ORGANISM-SEDIMENT RELATIONS ON THE MUDDY SEA FLOOR
OCEANOGR MAR BIOL AN REV 12:263-300

THIS REVIEW PAPER IDENTIFIES AND DESCRIBES BIOLOGICAL ACTIVITIES OF MACROFAUNA WHICH INFLUENCE THE PHYSI-CHEM. PROPERTIES OF THE MUDDY SEA FLOOR AND THE ECOLOGICAL FEEDBACK OF THESE BIOGENIC CHANGES. ORGANISMS POPULATING A MUD BOTTOM AND FEEDING ON SUSPENDED OR DEPOSITED PARTICULATE MATTER WILL MODIFY 1) THE GRAIN-SIZE DISTRIBUTION, GRAIN SHAPES AND SPATIAL SEGREGATION OF GRAIN SIZES 2) SEDIMENT MASS PROPERTIES INCLUDING SEDIMENT POROSITY, WATER CONTENT, COHESION AND COMPACTION 3) THE PHYSICAL STABILITY OF MUD RELATED TO MASS PROPERTIES OF THE BOTTOM AND 4) THE CHEMICAL PROPERTIES OF THE SEDIMENT SURFACE TO 30CM IN DEPTH, DEPENDING ON THE SPECIES PRESENT. THE PHYSICAL AND CHEMICAL CHANGES IN THE PROPERTIES OF THE SEAFLOOR EFFECTED BY THE BENTHOS CONTROL VARIOUS ASPECTS OF BENTHIC ECOLOGY INCLUDING 1) DIVERSITY OF TAXA AND BENTHIC FEEDING TYPES 2) NUTRIENT CYCLING AND 3) PRIMARY PRODUCTION.

RHOADS, D., R. ALLER AND M. GOLDHABER
1977 NO. 22
THE INFLUENCE OF COLONIZING BENTHOS ON PHYSICAL PROPERTIES AND
CHEMICAL DIAGENESIS OF THE ESTUARINE SEAFLOOR
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 113-138

DIVER-TAKEN BOX CORES FROM A DREDGE-SPOIL DUMP & CONTROL STATION
WERE USED TO DOCUMENT CHANGES IN: BENTHOS, SEAFLOOR STABILITY, WATER
DEPTH, WATER CONTENT, & PORE WATER
PROFILES. THE DUMP SURFACE MAY BE DIVIDED INTO
THREE STAGES: STAGE I (JUNE-JULY) REPRESENTED INITIAL RECRUITMENT
OF SHALLOW BURROWING SURFACE DEPOSIT FEEDERS,
& MEIOFAUNA. STAGE II (AUGUST-NOVEMBER) WAS A PHASE OF EXPONENTIAL
RECRUITMENT OF STAGE I POPULATIONS & NEW RECRUITMENT OF
DEEPER-FEEDING INFANULA. STAGE III (DECEMBER-APRIL) WAS A PERIOD OF
LEVELING OFF IN POPULATION DENSITIES. THE CONTROL STATION SHOWED
RELATIVELY CONSTANT STANDING CROPS OF DEEP-FEEDING DEPOSIT FEEDERS
OVER THE SAMPLING PERIOD. LATE STAGE III & STAGE III ABUNDANCES &
DIVERSITIES ON THE DUMP EXCEEDED THOSE AT THE CONTROL STATION.
HABIT MODIFICATION RELATED TO THE THREE COLONIZATION STAGES ARE:
STAGE I (SUMMER)--FECAL PELLET PRODUCTION STARTS & THE REDOX
POTENTIAL DISCONTINUITY (RPD) IS DEPRESSED TO ABOUT ONE CM BY
BIOTURBATION & RESPIRATION ACTIVITIES. STAGE II (FALL)--THE
SURFICIAL LAYER OF PELLETS EXPERIENCES SOME DESTRUCTION BY
MEIOFAUNAL GRAZING (); THE RPD IS DEPRESSED TO 2-3 CM & PORE
WATER PROFILES IN $\text{SO}_4 = \text{NH}_4^+$ APPROACH CONSTANT VALUES TO A DEPTH OF
3-6 CM. THE SEAFLOOR IS BOUND BY MICROBIAL EXUDATES (); STAGE III
(WINTER)--THE PELLETAL SURFACE DECAYS, THE RPD REBOUNDS TO A
DEPTH OF 1-2 CM. PORE WATER PROFILES BECOME PREDOMINANTLY
DIFFUSION CONTROLLED. MICROBIAL BINDING DECREASES. SEVERAL
HYPOTHESES ARE STATED REGARDING THE POTENTIAL IMPORTANCE OF THESE
HABITAT MODIFICATIONS TO THE COLONIZATION SEQUENCE.

RHOADS, D.C., P.L. MCCALL AND J.Y. YINGST
1978; NO. 37
DISTURBANCE AND PRODUCTION ON THE ESTUARINE SEAFLOOR
AM SCI 66:577-586

BENTHIC INVERTEBRATE SECONDARY PRODUCTIVITY OF ESTUARINE BOTTOMS
MAY BE MANIPULATED & OPTIMIZED USING DREDGED MATERIAL DISPOSAL
AS A CONTROLLED SOURCE OF DISTURBANCE.

RICHARDS, S.W. AND G.A. RILEY
1967 ND.ii
THE BENTHIC EPIFAUNA OF LONG ISLAND SOUND
BULL BINGHAM OCEANOGR COLLECT 19:90-135.

A MODIFIED OYSTER DREDGE WAS USED TO OBTAIN 48 COLLECTIONS FROM A STATION 1 (SAND-SHELL SUBSTRATE 9M) & STATION 3A (MUD, 16-17M) IN LONG ISLAND SOUND DURING THE PERIOD BETWEEN JUNE 1960 & JUNE 1961. THE STANDING CROP OF BENTHIC INVERTEBRATES WAS DETERMINED & THEIR PRODUCTIVITY WAS ESTIMATED; THE MATERIAL WAS EXAMINED WITH PARTICULAR EMPHASIS ON THE SPECIES THAT WERE NOT ONLY IMPORTANT FISH FOOD, BUT ALSO HAD BEEN COLLECTED INADEQUATELY BY GEAR OF THE TYPE USED IN PREVIOUS SURVEYS. THE GREATER DIVERSITY OF ENVIRONMENT AT ST. 1 RESULTED IN A GREATER DIVERSITY OF SPECIES THERE, PARTICULARLY EPIFAUNA, THAN AT ST. 3A. OF THE TOTAL OF 144 SPECIES, 127 OCCURRED AT ST. 1, 76 AT ST. 3A, & 59 WERE COLLECTED AT BOTH LOCALITIES. MEAN NUMERICAL STANDING CROP WAS 77.0/M², 1.76/67/M² AT ST. 1, 77.96/M² AT ST. 3A. MEAN BIOMASS WAS 1.098 G/M², 1.345 G/M² AT ST. 1 & 0.376 G/M² AT ST. 3A. THE EPIFAUNA STANDING CROP FROM ST. 1 WAS 10 TIMES BY NUMBER, & 7 TIMES BY WEIGHT THAT FROM ST. 3A, WHILE THE NUMERICAL ABUNDANCE OF INFRAUNA FROM ST. 1 WAS ONE HALF, & ITS BIOMASS WAS 1/14TH THAT FROM ST. 3A AT ST. 1. THE DOMINANT SPECIES WERE CRANGON SEPTEMSPINOSA, ASTERIAS FORBESI, HYDROIDS, PAGURUS LONGICARPOUS, NEOMYSIS AMERICANA, AMPELISCA VADORUM, & AMPHARETE ACUTIFRONS. OTHERS OF IMPORTANCE WERE NASSARIUS TRIVITTATUS, CANCER IRROATUS, NEOPANDOPTEXANA SAYI, COROPHIUM SP., & THE CAPRELLIDS. THE NEPTHSINCISA-YOLDIALIMATULANUCULA PROXIMA COMMUNITY AT ST. 3A INCLUDED ASTERIAS FORBESI, NEOMYSIS AMERICANA, CRANGON SEPTEMSPINOSA, RETUSA CANALICULATA, NASSARIUS TRIVITTATUS, CISTENIDES GOULDII, & GEMMA GEMMA, LISTED IN ORDER OF THEIR IMPORTANCE IN ANALYSES OF THE BIOLOGICAL ASSOCIATIONS. STANDING CROPS FROM PREVIOUS SURVEYS MADE WITH ANCHOR DREDGE WERE SEVERAL ORDERS OF MAGNITUDE GREATER THAN THOSE WITH THE OYSTER DREDGE. THE DISCREPANCIES RESULTED CHIEFLY FROM THE OPERATIONS OF THE TWO TYPES OF GEAR. THE ANCHOR DREDGE DUG DEEP & ALSO TOOK A LARGE PERCENTAGE OF ORGANISMS OF SMALL SIZE, WHILE THE OYSTER DREDGE MADE A SHALLOW CUT & ALSO CAUGHT A GREATER PERCENTAGE OF ORGANISMS OF LARGE SIZE. IN ADDITION, THE CATCHING EFFICIENCY OF AN OYSTER DREDGE IS LOW. CORRECTION FOR A MEAN

RICKER, W. E.
1978. NO. 40
ON COMPUTING PRODUCTION
LIMNOL OCEANogr 23: 379-380

THIS BRIEF COMMENT PRESENTS A POSSIBLE SOLUTION TO THE PROBLEM
OF ESTIMATING THE CONTRIBUTIONS TO SECONDARY PRODUCTION MADE BY
ANIMALS WHICH HAVE DIED DURING THE TIME INTERIM BETWEEN
POPULATION OBSERVATIONS.

ROBERTSON, A.
1979 NO. 16
THE RELATIONSHIP BETWEEN ANNUAL PRODUCTION: BIOMASS RATIOS
AND LIFESPANS FOR MARINE MACROBENTHOS
OECOLOGIA: 193-202.

SUMMARY. RECENT LITERATURE ON STUDIES OF PRODUCTION IN MARINE MACROBENTHOS IS REVIEWED, & A SIGNIFICANT CORRELATION BETWEEN ANNUAL P/B RATIOS & LIFESPAN IS SHOWN FOR SPECIES FROM A VARIETY OF PHYLA & HABITATS. A REGRESSION EQUATION WAS FITTED TO THE POOL DATA. THIS EQUATION MAY BE USED, IN CONJUNCTION WITH DATA ON MEAN ANNUAL BIOMASS, TO GIVE PRODUCTION ESTIMATES FOR POPULATIONS OF MARINE MACROBENTHIC SPECIES. IF SAMPLING IS NOT SIZE OR AGE SELECTIVE, & THE LIFESPANS OF THE POPULATIONS CAN BE DETERMINED

ROSENBERG, R.

1977 NO² DYNAMICS, PRODUCTION, AND DISPERSION IN AN
BENTHIC MACROFAUNAL ESTUARY OF WEST SWEDEN
OXYGEN-DEFICIENT J EXP MAR BIOL ECOL 26: 107-133.

THE SALINITY ABOVE THE HALOCLINE (13-15 MM) IN THE BYFJORD ESTUARY IS = 23-30‰. BELOW THE HALOCLINE THE OXYGEN CONCENTRATION DIMINISHES ABRUPTLY & BELOW 15-20 M THE WATER IS ANOXIC. THE BENTHIC MACROFAUNAL COMMUNITIES WERE STUDIED DURING 1971-1973 FROM 5M DOWN TO THE ANOXIC & ANAFAUNAL BOTTOMS. NUMBER OF SPECIES, ABUNDANCE, & BIOMASS WERE ESTIMATED IN DIFFERENT STRATA IN THE SEDIMENTS (0-5, 5-10 CM) & THE SEASONAL VARIATION WAS STUDIED. THE BENTHIC FAUNAL STRUCTURE AT DIFFERENT LOCALITIES HAS BEEN COMPARED BY MEANS OF A PERCENTAGE SIMILARITY INDEX & A NUMBER OF DIVERSITY INDICES. DISPERSION WAS ASSESSED BY THE VARIANCE/MEAN RATIO FOR DIFFERENT BLOCK SIZES & THE PRODUCTION OVER ONE YEAR WAS ESTIMATED.

ROWE, G.T., P.T. POLLONI AND S.G. HORNER
1974. NO. 65
BENTHIC BIOMASS ESTIMATES FROM THE NORTHWESTERN ATLANTIC OCEAN
AND THE NORTHERN GULF OF MEXICO
DEEP-SEA RES 21: 641-650.

ESTIMATES HAVE BEEN MADE OF THE BIOMASS & ABUNDANCE OF MACROBENTHIC INVERTEBRATES OFF THE GULF OF MEXICO & ATLANTIC COASTS OF THE UNITED STATES. BASED ON THESE ESTIMATES, IT IS CONCLUDED THAT DEEP-SEA LIFE IS MORE ABUNDANT IN THE ATLANTIC THAN IN THE GULF. REGRESSIONS OF THE LOGARITHM (BASE 10) OF BIOMASS & ANIMAL DENSITY AGAINST DEPTH INDICATE THAT THE ABUNDANCE OF LIFE FOLLOWED AN EXPONENTIAL DECLINE WITH DEPTH. $y = Ae^{-bx}$, WHERE y IS EITHER DENSITY OF INDIVIDUALS OR BIOMASS, x IS DEPTH & a IS PROPORTIONAL TO AVERAGE SURFACE-WATER PHYTOPLANKTON PRODUCTION; THE RATE OF DECLINE (b) CAN BE RELATED TO THE RATE OF DECREASE IN PHYTOPLANKTON PRODUCTION IN AN OFFSHORE DIRECTION & THE EFFICIENCY OF WATER-COLUMN HETEROTROPHS AT UTILIZING SINKING ORGANIC MATTER. THE REGRESSIONS ALSO INDICATE, THROUGH COMPARISON WITH THE LITERATURE, THAT BOTH BENTHOSES & ZOOPLANKTON FOLLOW SIMILAR EXPONENTIAL DECAYS IN QUANTITY OF LIFE WITH DEPTH. THE CONSTANTS (a) BOTH APPEAR TO BE FUNCTIONS OF SURFACE PRODUCTIVITY & IT CAN BE INFERRRED THAT THE SOURCES OF FOOD FOR ZOOPLANKTON & BENTHOS IN THE DEEP SEA ARE THE SAME. THE SEEMINGLY CONSERVATIVE NATURE OF ORGANIC MATTER OVER DEPTH RANGES WHERE THERE IS AN EXPONENTIAL DECREASE IN LIFE CAN PROBABLY BE ATTRIBUTED TO THE INCREASE IN THE RELATIVE ABUNDANCE OF THE REFRACATORY ORGANIC COMPOUNDS WITH DEPTH.

ROWE, G. AND K. SMITH JR.
NO. 23
1977 BENTHIC-PELAGIC COUPLING IN THE MID-ATLANTIC BIGHT
BENTHOS, UNIV S. CAROLINA PRESS: 55-66
IN COULL, B.C. (ED). ECOL MAR

THE HYPOTHESIS THAT THE CONTINENTAL SHELF IS AN IMPORTANT SITE OF NUTRIENT REGENERATION IS SUPPORTED BY HYDROGRAPHIC DATA COLLECTED IN MID-ATLANTIC BIGHT & A THEORETICAL RELATIONSHIP BETWEEN BOTTOM OXYGEN DEMAND & THE BREAKDOWN OF SEDIMENT ORGANIC MATTER. NUTRIENT FLUX OUT OF THE BOTTOM IS ESTIMATED FROM NEAR-BOTTOM AMMONIA GRADIENTS IN A FINITE DIFFERENCE EQUATION.

SALEMAA, H.

1979 NO. 18

ECOLOGY OF IDOTEA spp. (ISOPODA) IN THE NORTHERN BALTIc
OPHELIA. 18(1): 133-150.

THE POPULATION DYNAMICS & BREEDING BIOLOGY OF IDOTEA BALTICA, TWO CHELIPES & I. GRANULOSA WERE STUDIED IN THE LITTORAL BELTS OF TWO NORTHERN BALTIc ROCKY SHORE HABITATS. POPULATION SIZES ARE LARGEST IN THE AUTUMN, AFTER OCCUPATION OF THE FUCUS BELT BY A NEW IDOTEA GENERATION FROM THE BELT OF FILAMENTOUS ALGAE. TWO PERIODS OF DECREASE IN THE POPULATION DENSITY, ONE IN LATE AUTUMN & ANOTHER AFTER THE BREEDING PERIOD IN THE FOLLOWING SUMMER WERE OBSERVED. ADULT MALES ARE ELIMINATED FROM POPULATIONS BEFORE FEMALES. MOST INDIVIDUALS IN EACH SPECIES BREED SIMULTANEOUSLY IN EARLY SUMMER. BROOD NUMBERS ARE RELATED TO FEMALE SIZE, BUT GREAT MARSUPIAL MORTALITY OCCURS DURING INCUBATION. IDOTEA JUVENILES GROW EXPONENTIALLY IN LATE SUMMER, BUT DURING WINTER THE GROWTH IS DELAYED. ANOTHER PERIOD OF INTENSIVE GROWTH OCCURS IN SPRING BEFORE BREEDING. I. BALTIc IS THE DOMINANT SPECIES IN BOTH HABITATS EXAMINED. I. CHELIPIES & I. GRANULOSA WERE FOUND NOT TO COEXIST. THE ROLES OF DIFFERENT FACTORS AFFECTING THE DISTRIBUTION & GEOGRAPHICAL VARIATION IN IDOTEA ARE DISCUSSED.

SANDERS, H. L.

NO. 33
1956 OCEANOGRAPHY OF LONG ISLAND SOUND, 1952-1954. X. THE BIOLOGY OF
MARINE BOTTOM COMMUNITIES
BULL BINGHAM OCEANOGR COLLECT, YALE UNIV 15: 345-414

THE RESULTS OF A BOTTOM SURVEY CARRIED OUT FROM AUGUST 1953 TO SEPTEMBER 1954 REVEALED THAT LONG ISLAND SOUND, IN CONTRAST TO OTHER AREAS, SUPPORTS EXTREMELY LARGE POPULATIONS OF BENTHIC ANIMALS. THE MEAN NUMBER AT EACH STATION VARIED FROM 5,563 TO 46,398, WHILE THE MEAN WEIGHT OF ANIMALS LESS THAN 0.2 G DRY WAS CHARACTERIZED BY A NARROW RANGE OF BIOMASS VALUES WHICH WERE LARGELY DEPENDENT ON SEDIMENT COMPOSITION. THE GREATEST BIOMASSES WERE FOUND WHEN THE SEDIMENT CONTAINED FROM 13-25% SILT AND CLAY. THIS APPEARED TO BE AN OPTIMAL CONCENTRATION, SINCE BOTH INCREASES AND DECREASES OF THE SILT-CLAY FRACTION GAVE PROGRESSIVELY SMALLER BIOMASS VALUES. THE BIOLOGY OF SOME OF THE DOMINANT ANIMALS IS DISCUSSED. THE GENUS AMPELLISCA WAS PARTICULARLY INTERESTING IN THAT IT COULD BE DIVIDED INTO TWO DISTINCT GROUPS WITH RESPECT TO SIZE AND DISTRIBUTION ALTHOUGH THE GROUPS COULD NOT BE SEPARATED ON THE BASIS OF TAXONOMIC CHARACTERS. FORM A WAS CONFINED TO COARSER SEDIMENTS AND WAS 3-4 TIMES AS HEAVY AS ITS COUNTERPART, FORM B, WHICH WAS FOUND ONLY IN THE SOFTER SEDIMENTS. IN BOTH SPECIES THE FEMALES APPEARED TO BE ABOUT 15 TIMES MORE ABUNDANT THAN APPROXIMATELY HALF OF THE FEMALES WERE GYNO MORPHIC MALES. VALUES FOR ORGANIC PRODUCTON WERE OBTAINED FOR FOUR OF THE DOMINANT SPECIES. ON THE BASIS OF THESE FIGURES, THE ANNUAL PRODUCTIVITY (2.44 X LARGER THAN THAT OF THE MEAN STANDING CROP) WAS DETERMINED FOR THE INFRAUNA. THE RELATIONSHIP BETWEEN PRIMARY FEEDING TYPES AND SEDIMENT COMPOSITION WAS INVESTIGATED. SUSPENSION FEEDERS WERE CLEARLY THE MAJOR FEEDING TYPES IN COARSER SEDIMENTS, WHILE SELECTIVE AND NONSELECTIVE DEPOSIT FEEDERS DOMINATED THE FINER SEDIMENTS. A NEW ASSOCIATION OF ANIMALS, THE NEPHTHYS INCISA-YOLDIA LIMATULA COMMUNITY IS DESCRIBED. THIS SOFT BOTTOM COMMUNITY IS LIMITED TO SEDIMENTS CONTAINING MORE THAN 25% SILT-CLAY AND IS FOUND AT DEPTHS OF FROM 4 TO AT LEAST 30 M.

SANDERS, H. L.
1958. NO. 28
BENTHIC STUDIES IN BUZZARDS BAY. I. ANIMAL-SEDIMENT RELATIONSHIPS
LIMNOL. OCEANOGR. 3(3):245-258.

DURING OCTOBER AND NOVEMBER 1955 A BOTTOM FAUNAL STUDY WAS UNDERTAKEN AT 19 LOCALITIES IN BUZZARDS BAY, MASSACHUSETTS. THE NUMBER OF ANIMALS RANGED FROM 1,064 TO 12,576/M² WITH A MEAN NUMBER OF 4,430. IN COMPARISON WITH CERTAIN OTHER AREAS THESE NUMBERS APPEARED SMALL AND SEEMED TO BE DUE TO THE RELATIVELY LOW CONCENTRATIONS OF CHEMICAL NUTRIENTS AND MODEST PRIMARY PRODUCTION OF THE REGION. TWO FAUNAL ASSEMBLAGES WERE RECOGNIZED: ONE, PRESENT IN THE MUDDY SEDIMENTS AND DOMINATED BY THE LAMELLIBRANCH *NUCULA PROXIMA* AND THE POLYCHAETE *NEPHTHYTHIS INCISA* WAS ESSENTIALLY THE SAME COMMUNITY DESCRIBED FROM LONG ISLAND SOUND; THE OTHER, RESTRICTED TO THE SANDIER SEDIMENTS AND CHARACTERIZED BY SPECIES OF THE AMPHIPOD GENUS *AMPELISCA*. THE TWO PRIMARY FEEDING TYPES, THE FILTER-FEEDERS AND THE DEPOSIT-FEEDERS, NUMERICALLY DOMINATED IN THE SAND AND MUD SEDIMENTS, RESPECTIVELY. THE DISTRIBUTION OF CERTAIN DOMINANT DEPOSIT-FEEDERS IN LONG ISLAND SOUND AND BUZZARDS BAY WAS POORLY CORRELATED WITH THE SILT-CLAY FRACTION OF THE SEDIMENT; HOWEVER, WHEN CLAY ALONE WAS USED, A MUCH BETTER AGREEMENT WAS OBTAINED. IT WAS SUGGESTED THAT CLAY IS PROBABLY THE MOST VALID CRITERION FOR THE DISTRIBUTION OF DEPOSIT-FEEDERS. THE DISTRIBUTION OF INFANAL FILTER-FEEDERS SEEMED RELATED TO THE DEGREE OF SORTING AND THE MEDIAN GRAIN SIZE OF THE SEDIMENT, WITH LARGEST POPULATIONS PRESENT IN WELL-SORTED FINE SAND. THE HYDRODYNAMIC IMPLICATIONS OF THIS DISTRIBUTION ARE DISCUSSED.

SARNHEIN, M. AND W. RICHTER
NO. 94
1974. SUBMARINE EXPERIMENTS ON BENTHIC COLONIZATION OF SEDIMENTS IN THE
WESTERN BALTIc SEA. I. TECHNICAL LAYOUT
MAR BIOL 28: 159-164.

SUBMARINE SEDIMENTARY SUBSTRATES HAVE BEEN EXPOSED IN A NEW-STYLE SPECIAL ARRANGEMENT FOR BENTHIC COLONIZATION. THE EXPERIMENT HAS BEEN RUNNING FOR 2 YEARS & IS PLANNED TO CONTINUE AS A LONG-TERM TEST FOR SEVERAL MORE YEARS, WITH THE PURPOSE OF STUDYING FACTORS AS INDEPENDENTLY BOTH THE EFFECTS OF HYDROGRAPHIC & BIOTIC FACTORS AS WELL AS THOSE OF SUBSTRATE TYPE. THIS IS ACCOMPLISHED BY 3 FLOATING PLATFORMS, EACH CARRIES 3 OPEN CONTAINERS FILLED WITH CLAYEY MUD, SAND, & GRAVEL (70 CM DIAMETER, 25 CM DEEP). THE PLATFORMS ARE ANCHORED CLOSE TOGETHER AT 11, 15 & 19 M WATER DEPTHS, THEIR DISTANCES FROM THE SEA FLOOR VARY BETWEEN 5.5 & 2.0 M. THE SEDIMENTS WERE OBTAINED FROM SAND PITS ON LAND. SUBSTRATE SAMPLES ARE CONTINUOUSLY TAKEN BY DIVERS. HYDROGRAPHIC DATA ARE AVAILABLE BY DIRECT MEASUREMENTS FROM A SHIP & AUTOMATIC SENSORS. THE CHARACTERISTIC SOURCES OF ERROR OF THE EXPERIMENT SEEM TO EXERT NO DECISIVE INFLUENCE ON THE BENTHIC PRODUCTION DATA.

SEAPY, R.R. AND C.L. KITTING
1978 NO. 85
SPACIAL STRUCTURE OF AN INTERTIDAL MOLLUSCAN ASSEMBLAGE ON A
SHELTERED SANDY BEACH
MAR BIOL 46: 137-145.

THE INTERTIDAL MOLLUSCAN FAUNA ON A SANDY-MUD BEACH IN NEWPORT BAY CALIFORNIA, USA, IS DIVISIBLE INTO TWO VERTICALLY DISTINCT SPECIES ASSEMBLAGES WHICH CORRESPOND TO THE MIDLITTORAL ZONE & SUBLITTORAL FRINGE OBSERVED ON ROCKY COASTLINES & EXPOSED SANDY BEACHES. THE SPECIES ASSEMBLAGE COMPRISING THE MIDLITTORAL ZONE IS UNUSUAL; HOWEVER, IN THAT THE NUMERICALLY DOMINANT SPECIES ARE NOT CONFINED TO THIS ZONE BUT RANGE DOWNWARD THROUGH THE SUBLITTORAL FRINGE. THE TWO SPECIES ASSEMBLAGES ARE VERTICALLY SEPARATED AT +0.5 FT TO +1.0 FT (+0.15 TO +0.30 M); RELATIVE TO 0.0 TIDAL DATUM AT MEAN LOWER LOW WATER), WHICH IS HIGHER THAN PREVIOUSLY OBSERVED FOR THE SEPARATION BETWEEN THE MIDLITTORAL ZONE & SUBLITTORAL FRINGE ON ROCKY SHORES & EXPOSED SANDY BEACHES. THE SPECIES COMPOSITION OF SOME OF THE SAMPLES AT +0.5 & +1.0 FT (+0.15 & +0.30 M) WAS INTERMEDIATE BETWEEN SAMPLES HIGHER & LOWER ON THE BEACH, WHILE SEVERAL SAMPLES WERE DEVOID OF MOLLUSCS ALTOGETHER. ADDITIONALLY, THE SURFACE SEDIMENTARY ENVIRONMENT CHANGES IN TERMS OF AN INCREASED PERCENT SILT-CLAY FRACTION & HIGHER SORTING COEFFICIENTS BELOW +0.5 FT (+0.15 M). SINCE INFAUNAL ZONATION IS CORRELATED WITH TIDAL HEIGHT AT THE SUBSTRATE SURFACE, ENVIRONMENTAL FACTORS OPERATIVE AT THE SURFACE ARE PROBABLY MOST IMPORTANT IN INFLUENCING THE ZONATION ON THIS BEACH.

SHEPARD, F.P. NO. 46
1954. NOMENCLATURE BASED ON SAND-SILT-CLAY RATIOS
J SEDIMENT PETROL 24 (3): 151-158.

FOLLOWING A CANVASSING OF SEDIMENTATIONISTS AN ATTEMPT IS MADE TO STANDARDIZE NOMENCLATURE OF SEDIMENT TYPES RELATIVE TO SAND, SILT, AND CLAY CONTENT. A TRIANGLE DIAGRAM WITH BOUNDARIES BETWEEN TYPES WHICH MET WITH GENERAL APPROVAL IS SUBMITTED & COMPARED WITH OTHER SYSTEMS WHICH HAVE BEEN USED FOR THE PURPOSE. THE NEW SYSTEM USES OLD WELL ESTABLISHED NAMES & HAS A SIMPLICITY & SYMMETRY WHICH MAKE IT EASILY REMEMBERED. THE BOUNDARIES APPEAR TO BE WELL LOCATED FOR DESCRIPTION OF SEDIMENTS SUCH AS THOSE THAT HAVE BEEN ANALYZED IN LARGE VOLUME FROM THE INVESTIGATIONS OF THE NORTHERN GULF OF MEXICO (API PROJECT 51), BUT IT IS INADEQUATE IN DESCRIBING WELL SORTED SEDIMENTS WITH MEDIAN DIAMETERS NEAR THE BOUNDARIES OF SAND & SILT OR SILT & CLAY. THE NOMENCLATURE SUGGESTED APPLIES ONLY TO SEDIMENT GRADE SIZES SO THAT OTHER NAMES SHOULD BE USED DEPENDING ON OTHER CHARACTERISTICS OF THE SEDIMENTS. FURTHERMORE, THE NOMENCLATURE SHOULD NOT BE APPLIED TO SEDIMENTS CONTAINING LARGE PERCENTAGES OF GRAVEL.

SHERMAN, K. M. AND B. C. COULL
NO. 70
1980. RESPONSE OF MEIOFAUNA TO SEDIMENT DISTURBANCE
J. EXP. MAR. BIOL. ECOL. 46(1): 59-71.

THE MEIOBENTHOS INHABITING AN INTERIDAL MUD BAR WERE DISTURBED BY HAND-TURNING THE SEDIMENT OF A 9-M² AREA WITH A SHOVEL & MONITORING THE SUBSEQUENT RECOLONIZATION PROCESS. THE IMMEDIATE IMPACT OF THE DISTURBANCE ON THIS COMMUNITY DOMINATED BY NEMATODA (91%), COPEPODA (4%) & FORAMINIFERA (4%) WAS TO REMOVE MORE THAN 70% OF MEIOFAUNA. HOWEVER, AFTER ONLY ONE TIDAL CYCLE, TOTAL NUMBERS OF NEMATODES, COPEPODS, FORAMINIFERANS & OTHER MEIOFAUNA TAXA WERE AT PREDISTURBANCE & CONTROL (SIMILAR 9-M² SITE ON THE SAME FLAT) DENSITY VALUES. NEMATODE SPECIES ASSEMBLAGES RAPIDLY ADAPTED TO THE DISTURBANCE & CHANGED LITTLE OVER TIME. FORAMINIFERA SHOWED INSIGNIFICANT MORTALITY, & INCREASED IN ABUNDANCE 10 DAYS AFTER THE INITIAL DISTURBANCE. TRANSPORT WITHIN THE FLUIDIZED FLOCCULENT UPPER LAYER OF SEDIMENT WAS PROBABLY THE MAJOR MECHANISM IN THIS COMMUNITY, & FORAMINIFERANS SEEM TO BE THE LEAST ABLE TO USE THIS MECHANISM. THE MEIOBENTHOS OF THIS HABITATE IS DESCRIBED AS A WELL-DISPersed & DYNAMIC COMMUNITY ABLE TO RAPIDLY ADJUST TO SMALL-SCALE DISTURBANCES, HOWEVER, THE MEIOBENTHOS MAY NOT RECOVER FROM ALL DISTURBANCES, BECAUSE RESILIENCE WAS ONLY DETERMINED FOR A LIMITED PHYSICAL DISTURBANCE.

SIMON, J. AND D. DAUER
1977 NO. 21
REESTABLISHMENT OF A BENTHIC COMMUNITY FOLLOWING NATURAL
DEFAUNATION
COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS: 139-154

DURING SUMMER 1971, A MASSIVE OUTBREAK OF RED TIDE RESULTED IN THE DEFAUNATION OF A SANDY, INTERTIDAL HABITAT IN UPPER OLD TAMPA BAY, TAMPA, FLORIDA. COLONIZATION OF THE HABITAT WAS STUDIED FROM AUGUST 1971 TO JULY 1973. A TRANSECT COMPOSED OF 4 STATIONS RUNNING FROM JUST BELOW MEAN HIGH WATER TO JUST BELOW MEAN LOW WATER WAS QUANTITATIVELY SAMPLED EACH MONTH FOR SPECIES COMPOSITION, DENSITIES OF INDIVIDUAL POPULATIONS, & DISTRIBUTION OF AGE CLASSES. DURING THE 24 MONTHS OF SAMPLING, 153 SPECIES OF BENTHIC INFAUNA INVERTEBRATES WERE IDENTIFIED. SPECIES COLONIZATION & ABUNDANCE PATTERNS OVER TIME WERE STUDIED FOR THE ENTIRE MACROFAUNA. IN ADDITION, FIVE MAJOR TAXONOMIC CATEGORIES WERE EXAMINED SEPARATELY: POLYCHAETES, MOLLUSCS, AMPHIPODS, OTHER CRUSTACEANS (ISOPODS, CUMACEANS, SHRIMPS, CRABS, ETC.) & MISCELLANEOUS (AMPHIPODS, BRACHIOPODS, RHYNCHOCOELS, CHAETOGNATHS, OLIGOCHAETES, PLATYHELMINTHS, & ANEMONES). THE FAUNA MADE A RAPID RECOVERY IN TERMS OF SPECIES NUMBERS & COMPOSITION, RETURNING TO MUCH THE SAME ASSEMBLAGE AS PRIOR TO THE RED TIDE. POLYCHAETES WERE THE MOST RAPID COLONIZERS BOTH IN TERMS OF THE NUMBER OF SPECIES & NUMBER OF INDIVIDUALS. MOLLUSCS & AMPHIPODS WERE SLOWER IN APPEARANCE & ALSO WERE SIGNIFICANTLY AFFECTED BY SEASONAL PATTERNS OF REPRODUCTION, & THUS DISPERSAL ONLY THE POLYCHAETES, OTHER CRUSTACEA, & THE TOTAL FAUNA SHOWED SPECIES COLONIZATION PATTERNS WHICH INDICATED AN APPROACH TO AN EQUILIBRIUM VALUE. SPECIES ABUNDANCE PATTERNS SHOWED A VARIETY OF RESPONSES FROM STRONG SEASONAL INFLUENCES (MOLLUSCS & AMPHIPODS) TO A CONTINUOUSLY INCREASING PATTERN (TOTAL FAUNA). THE DEMONSTRATION OF DIFFERENT COLONIZING ABILITIES AMONG MAJOR TAXA LEADS TO THE CONCLUSION THAT CARE SHOULD BE USED WHEN INTERPRETING ENVIRONMENTAL PERTURBATION STUDIES WHERE ONLY A SINGLE TAXON HAS BEEN EXAMINED.

SIMPSON, R. D. NO. 58
1977 THE REPRODUCTION OF SOME LITTORAL MOLLUSCS FROM MACQUARIE ISLAND
(SUB-ANTARCTIC)
MAR BIOL 44: 125-142.

THE REPRODUCTION OF 9 SPECIES OF LITTORAL MOLLUSCS FROM THE SUB-ANTARCTIC MACQUARIE ISLAND WAS EXAMINED. THE MODE OF LARVAL DEVELOPMENT IS REPORTED FOR ALL SPECIES, & THE REPRODUCTIVE PATTERNS FOR 7 ARE DESCRIBED FROM COLLECTIONS TAKEN MONTHLY OVER A PERIOD OF 1 YEAR. TWO SPECIES RELEASE GAMETES FOR EXTERNAL FERTILIZATION, WHEREAS THE OTHER 7 HAVE NON-PELAGIC DEVELOPMENT VIA BROODING OR THE LAYING OF EGG CASES; SOME OF THESE FINDINGS WERE DEDUCED FROM EXAMINATION OF GONADS RATHER THAN BY DIRECT OBSERVATION. FEATURES OF REPRODUCTION IMPORTANT IN ANY CORRELATION BETWEEN A LITTORAL ANIMAL'S REPRODUCTION & ITS HABITAT ARE DISCUSSED, & RELATIONSHIPS BETWEEN PELAGIC & NON-PELAGIC DEVELOPMENT OF THE MACQUARIE MOLLUSCS & (A) DISTRIBUTION IN THE LOCAL ENVIRONMENT & (B) HABITAT ARE DRAWN. THE WIDELY RECOGNISED CORRELATION BETWEEN SPECIES HAVING A NON-PELAGIC DEVELOPMENT & SMALL NUMBER & LARGE SIZE OF EGGS IS CONSIDERED AS A METHOD FOR PREDICTING THE TYPE OF LARVAL DEVELOPMENT (IN TERMS OF PELAGIC VERSUS NON-PELAGIC) FROM AN EXAMINATION OF THE OVARY. IT IS SUGGESTED THAT FURTHER DATA ON MODES OF DEVELOPMENT COULD BE OBTAINED FROM SPECIMENS OF MARINE INVERTEBRATES COLLECTED THROUGHOUT SOUTHERN LATITUDES & THAT SUCH DATA WOULD ENHANCE ZOOGEOGRAPHICAL INTERPRETATIONS.

SOKOLOVA, M.N.
1972 NO. 88
TROPHIC STRUCTURE OF DEEP SEA MACROBENTHOS
MAR BIOL 16: 1-12

THE EFFECT OF THE TROPHIC FACTOR ON LARGE-SCALE DISTRIBUTIONAL PATTERNS OF DEEP-SEA MACROBENTHOS INHABITING THE FLOOR OF THE WORLD OCEAN HAS BEEN STUDIED TWO HUNDRED & TWENTY-EIGHT BOTTOM TRAWL SAMPLES COLLECTED BY SOVIET RESEARCH VESSELS IN THE PACIFIC & INDIAN OCEANS AT DEPTHS RANGING FROM 3000 TO 6000 M WERE ANALYZED FOR EACH SAMPLE, THE WEIGHT OF ANIMALS WITH A SIMILAR MODE OF FEEDING WAS DETERMINED. THE WEIGHT RATIO OF REPRESENTATIVES OF THREE MAIN TROPHIC GROUPS, I.E., DEPOSIT-FEEDER SUSPENSION-FEEDERS & CARNIVORES. THESE DATA, INDICATING PREDOMINANCE OF ALTERNATE GROUPS AS WELL AS DATA ON THEIR GEOGRAPHIC DISTRIBUTION, WERE RELATED TO FEEDING CONDITIONS WHICH DEPEND ON: (1) RATES OF SEDIMENTATION, (2) NATURE OF SEDIMENTS, (3) CONTENT OF ORGANIC CARBON, (4) DEGREE OF TRANSFORMATION OF ORGANIC MATTER ON & WITHIN SEDIMENTS, &, WHEN AVAILABLE, (5) DATA ON REDOX POTENTIAL; BIOCHEMICAL OXYGEN CONSUMPTION, & STATE OF HETERO-TROPHIC MICROFLORA IN THE SEDIMENTS. IN DEALING WITH THE FEEDING CONDITIONS OF DEEP-SEA MACROBENTHOS IN THE ATLANTIC OCEAN, BIOLOGICAL CHARACTERISTICS WERE DEDUCED FROM LITERATURE DATA ON THE COMPOSITION OF SEDIMENTS, THEIR REDOX POTENTIAL & ORGANIC CARBON CONTENT. AS A RESULT OF THIS RESEARCH, EUTROPHIC & OLIGO-DISTINGUISHED & THEIR BOUNDARIES DEFINED. EUTROPHIC REGIONS LIE WITHIN AREAS WITH HIGH BIOLOGICAL PRODUCTIVITY OF SURFACE-WATERS LAYERS, & COVER THE PERIPHERAL & EQUATORIAL PARTS OF THE OCEANS; THEY ARE CHARACTERIZED BY QUANTITIES OF LABILE (DIGESTIBLE) ORGANIC MATTER WITHIN SEDIMENTS WHICH ARE SUFFICIENT FOR DEPOSIT-FEEDERS TO PREDOMINATE IN EUTROPHIC REGIONS EVERYWHERE EXCEPT ON CONSIDERABLE BOTTOM ELEVATIONS; OLIGOTROPHIC REGIONS ARE CONFINED TO OPEN AREAS OF THE OCEANS LYING BEYOND THE EQUATORIAL BELT; THEY ARE CHARACTERIZED BY VERY LOW RATES OF SEDIMENTATION &, CONSEQUENTLY, BY SCARCE QUANTITIES OF DEPOSITED ORGANIC MATTER. HERE, SUSPENSION-FEEDERS PREDOMINATE, ALTHOUGH THEIR POPULATION DENSITY IS VERY LOW.

STONER, A.W.

NO. 69
THE ROLE OF SEAGRASS BIOMASS IN THE ORGANIZATION OF BENTHIC
MACROFAUNAL ASSEMBLAGES
BULL MAR SCI 30(3): 537-551.

A ONE YEAR SURVEY OF BENTHIC MACROFAUNA WAS CONDUCTED OVER A SERIES OF SUBTIDAL SITES CHARACTERIZED BY DIFFERENT STANDING CROPS OF BENTHIC MACROPHYTES. SINCE THE STATIONS HAD SIMILAR GRANULOMETRIC PROPERTIES, THE ROLE OF SEAGRASS BIOMASS IN REGULATING COMMUNITY ORGANIZATION OF BENTHIC MACROFAUNA COULD BE TESTED INDEPENDENTLY, UNLIKE EARLIER STUDIES. THE DENSITY OF MACROBENTHIC ANIMALS (N/M^2) WAS DIRECTLY RELATED TO MEAN MACROFLORAL BIOMASS AS WAS THE NUMBER OF SPECIES TAKEN OVER THE SAMPLING PERIOD. THE UNVEGETATED SITE WAS CHARACTERIZED BY THE HIGHEST DEGREE OF FAUNAL DOMINANCE & A SPECIES COMPOSITION DISTINCT FROM THAT FOUND AT VEGETATED SITES. THE RELATIVE ABUNDANCES OF EPIFAUNAL AMPHIPODS & EPIFAUNAL POLYCHAETES WERE DIRECTLY RELATED TO MACROPHYTE BIOMASS. ABUNDANCE OF DEPOSIT FEEDING & OMNIVOROUS POLYCHAETES DECREASED AS A FUNCTION OF MACROPHYTE STANDING CROP, WHEREAS SUSPENSION FEEDING & CARNIVOROUS POLYCHAETES INCREASED WITH VEGETATION. BIOMASS OF BENTHIC MACROPHYTES, INDEPENDENT OF SEDIMENT GRANULOMETRY & HYDRODYNAMIC EFFECTS, WAS AN IMPORTANT REGULATOR OF SPECIES ABUNDANCES, DOMINANCE, DIVERSITY, & TROPHIC ORGANIZATION IN MACROFAUNAL ASSEMBLAGES.

SUBRAHMANYAM, C. B. AND W. L. KRUCZYNSKI

1979 NO. 48

COLONIZATION OF POLYCHAETOUS ANNELIDS IN THE INTERTIDAL ZONE OF A DREDGED MATERIAL ISLAND IN NORTH FLORIDA
ECOL. DIV. THEORY AND PRACTICE, INT'L. CO-OP. PUB. HOUSE, MARYLAND.

A STUDY WAS CONDUCTED TO UNDERSTAND THE SEQUENCE OF COLONIZATION & COMMUNITY FORMATION ON A MAN-MADE ISLAND WITH DREDGE SPOIL IN DICKERSON'S BAY, NORTH FLORIDA, IN RELATION TO SUBSTRATE & TIDE LEVELS. TRIPPLICATE MONTHLY SAMPLES WERE OBTAINED WITH A 0.0625 M² & 10 CM DEEP METAL CORER FROM FOUR STATIONS ALONG A TRANSECT, & THE SUBSTRATE WAS SCREENED TO 0.5 MM. THOUGH DENSITIES PER M² DISPLAYED PRONOUNCED SEASONAL VARIATIONS, THE MEAN DENSITIES OF STATIONS WERE COMPARABLE. NO DEFINITE CORRELATION BETWEEN SUBSTRATE & TROPHIC TYPES WAS DETECTED. A TOTAL OF 29 SPECIES COLONIZED THE ISLAND, SEASONAL SPECIES SUCCESSION & HABITAT EXPANSION WITHIN THE INTERTIDAL ZONE OCCURRED, & A PETERSEN-TYPE COMMUNITY WITH VISIBLE DOMINANTS BECAME ESTABLISHED. THERE WERE SLIGHT DIFFERENCES IN DOMINANCE HIERARCHY BETWEEN STATIONS, & SEASONAL PATTERNS OF VARIATIONS OF SPECIES DIVERSITY (H') & SPECIES RICHNESS (D) INDICATED THAT IMMIGRATION OF NEW SPECIES GOVERNED THE DIVERSITY. THE SPECIES OVERLAP (C) BETWEEN STATIONS WAS CONSIDERABLE INDICATING THAT THE WHOLE POLYCHAETE ASSEMBLAGE WAS ONE COMMUNITY. SPECIES EQUILIBRIUM WITHIN THE YEAR WAS NOT OBSERVED

SUTHERLAND, J. P. AND R. H. KARLSON
1977 NO. 68
DEVELOPMENT AND STABILITY OF THE FOULING COMMUNITY AT BEAUFORT,
NORTH CAROLINA
ECOL MONOGR 47: 425-446.

COMMUNITY DEVELOPMENT WAS FOLLOWED FOR 2 1/2 TO 3 1/2 YEARS ON
UNGLOZED CERAMIC TILE PLATES (232 CM²), SUSPENDED HORIZONTALLY
BENEATH THE DUKE UNIVERSITY MARINE LABORATORY DOCK, IN BEAUFORT,
NORTH CAROLINA. A SERIES OF 3 OR 4 PLATES WERE SUBMERGED AT
APPROXIMATELY THE 1/3 OF EACH MONTH FROM MAY-NOVEMBER 1971 & FROM
APRIL-NOVEMBER 1972. PERCENTAGE COVER FOR EACH SPECIES THAT
SETTLED & GREW ON THE LOWER SURFACE WAS ESTIMATED AT 6-TO 8-WEEK
INTERVALS, USING 75 POINTS RANDOMLY POSITIONED OVER THE PLATE AREA
SAMPLES WERE NONDESTRUCTIVE; PLATES WERE RESUBMERGED AFTER EACH
CENSUS. LARVAL RECRUITMENT WAS ESTIMATED AT 1-TO 3-WEEK INTERVALS
ON NEWLY SUBMERGED PLATES. TEMPERATURE & SALINITY WERE ALSO
MEASURED. INITIAL COMMUNITY DEVELOPMENT PATTERNS WAS RELATIVELY PREDICTABLE.
LARVAL RECRUITMENT PATTERNS VARIED MARKEDLY FROM
YEAR TO YEAR & AS A RESULT, DIFFERENT PATTERNS OF INITIAL
COMMUNITY DEVELOPMENT WERE OBSERVED BOTH WITHIN & BETWEEN YEARS.
INSTEAD OF PREPARING THE WAY FOR SUBSEQUENT ARRIVALS, MOST RESIDENT
ADULTS STRONGLY INHIBITED THE RECRUITMENT & GROWTH OF OTHER
SPECIES. SPECIES VARIED IN THEIR ABILITY TO RESIST SUBSEQUENT
INVASION AS ADULTS & IN THEIR ABILITY TO INVADE OCCUPIED SUBSTRATE
AS LARVAE; AFTER AN UNPREDICTABLE INITIAL DEVELOPMENTAL PHASE,
SUBSEQUENT CHANGES IN SPECIES COMPOSITION DEPENDED IN PART ON THE
DEGREE TO WHICH LARVAE WERE ABLE TO INVADE EXISTING ADULT
ASSEMBLAGES. THIS IN TURN DEPENDED ON THE IDENTITY OF THE RESIDENT
ADULTS & THE IDENTITY OF THE INVADING LARVAE. AS A RESULT, THE
DIRECTION & RATES OF COMMUNITY DEVELOPMENT DEPENDENT ON THE ORDER
OF INITIAL INVASION & SUBSEQUENT RECRUITMENT, WERE DIFFICULT TO
PREDICT ALTHOUGH AN EQUILIBRIUM NUMBER OF 8-10 SPECIES/PLATE WAS
OFTEN OBSERVED. ADULT RESIDENCE TIME WAS GENERALLY <1 YEAR & THE
MORTALITY &/OR DISAPPEARANCE OF THESE ADULTS PRODUCED 20-60%
FREE SPACE ON AN APPROXIMATELY ANNUAL BASIS. THIS FREE SPACE WAS
USUALLY OCCUPIED BY RECRUITS OF A DIFFERENT SPECIES THAN THE
ORIGINAL OCCUPANT. THE COMBINED ADDITION OF SPECIES THROUGH LARVAL
RECRUITMENT & SUBTRACTION OF SPECIES AS A RESULT OF ADULT
MORTALITY PRODUCED DRAMATIC CHANGES IN COMMUNITY STRUCTURE EACH

TEAL, J. M.

1957 NO. 34
COMMUNITY METABOLISM IN A TEMPERATE COLD SPRING
ECOL MONogr 27(3):283-302

THE RESULTS OF A COMMUNITY METABOLISM STUDY CONDUCTED IN 1953-54
IN A TEMPERATE COLD SPRING ARE PRESENTED. THE EMPHASIS IS ON THE
ACCURATE PRESENTATION OF ENERGY FLOW THROUGH ALL THE POPULATIONS
OF THE COMMUNITY. THE PAPER PROVIDES INFORMATION ON RATES OF
RESPIRATION, ENERGY ASSIMILATION, CONVERSION, PREDATORY AND
NON-PREDATORY MORTALITIES AND OTHER SOURCES OF ENERGY LOSS WITHIN
THE COMMUNITY.

TENORE, K.R.
1977⁴⁴
UTILIZATION OF AGED DETRITUS DERIVED FROM DIFFERENT SOURCES BY THE
POLYCHAETE CAPITELLA CAPITATA
MAR BIOL 44: 51-55.

BECAUSE THE RATE OF MICROBIAL DEGRADATION DIFFERS FOR THE VARIOUS SOURCES CONTRIBUTING TO THE DETRITAL POOL IN MARINE SYSTEMS, THEIR AVAILABILITY TO DETRITIVORES MIGHT ALSO VARY. CARBON-14 TRACER & EXPERIMENTS WERE USED TO COMPARE DIFFERENCES IN THE OXIDATION & NET INCORPORATION BY THE POLYCHAETE CAPITELLA CAPITATA OF A NITROGEN-RICH, EASILY-DECOMPOSABLE DETRITUS DERIVED FROM THE RED MACROPHYTIC ALGAE GRACILARIA SP. VERSUS A NITROGEN-POOR, DECAY-RESISTANT DETRITUS DERIVED FROM THE EELGRASS ZOSTERA MARINA. THE NET INCORPORATION OF GRACILARIA SP. DETRITUS BY C. CAPITATA REACHED A MAXIMUM (91 UG DRY WEIGHT OF DETRITUS/MG DRY WEIGHT OF WORM/DAY) AFTER ONLY 14 DAYS OF DECOMPOSITION, WHEREAS THAT OF Z. MARINA DETRITUS EQUALLED THIS LEVEL AFTER 30 DAYS OF AGING. BUT CONTINUED TO INCREASE TO 375 UG AT 180 DAYS. THE OXIDATION RATE OF GRACILARIA SP. DETRITUS WAS CONSISTENTLY HIGHER (PEAK OF 61 MG DRY WEIGHT OF DETRITUS/DAY AT 30 DAY-AGING) THAN Z. MARINA DETRITUS, WHICH REACHED THIS LEVEL ONLY AFTER 180 DAYS OF AGING. THE PRESENCE OF ABSENCE OF C. CAPITATA DID NOT SIGNIFICANTLY ALTER THE OXIDATION RATE. THE ABOVE DIFFERENCE MIGHT BE ATTRIBUTED TO A RAPID EXPLOITATION & MINERALIZATION BY BACTERIA OF THE MORE AVAILABLE GRACILARIA SP. DETRITUS, BUT A SLOW "CONTROLLED" UTILIZATION BY THE MICROBES OF THE LESS AVAILABLE Z. MARINA DETRITUS, ESPECIALLY DURING THE EARLY STAGE OF DECOMPOSITION. THIS WOULD ALLOW MAXIMUM EXPLOITATION OF THE SUBSTRATE BY MACRO CONSUMERS, RESULTING IN MORE OF THE DETRITAL RESOURCE BEING TIED UP IN DETRITIVORE BIOMASS RATHER THAN BEING RAPIDLY MINERALIZED TO CO₂. DIFFERENCE IN THE LENGTH OF AGING AT WHICH VARIOUS DETRITAL SOURCES BECOME AVAILABLE TO DETRITIVORES COULD RESULT IN A TEMPORAL PARTITIONING OF FOOD RESOURCES & SHOULD BE CONSIDERED IN ATTEMPTING TO UNDERSTAND THE DYNAMICS OF DETRITAL-BASED FOOD CHAINS.

THORSON, G.

NO. 32
1966. FACTORS INFLUENCING THE RECRUITMENT AND ESTABLISHMENT OF
MARINE BENTHIC COMMUNITIES
NETHERLANDS J RES 3(2): 267-293.

THE "PARALLEL" COMMUNITIES CONCEPT STATES THAT THE SAME TYPE OF SEDIMENT SUBSTRATE AT ABOUT THE SAME DEPTH WHETHER IN COLD, TEMPERATE OR WARMER REGIONS, WOULD BE INHABITED BY A SERIES OF MACROFAUNA-COMMUNITIES, IN WHICH THE QUANTITATIVELY PREDOMINATING ANIMALS WILL BELONG TO THE SAME GENERA BUT TO DIFFERENT SPECIES. SUPPORT FOR THE PARALLEL COMMUNITIES CONCEPT INCREASED FROM 1957 TO 1965 WITH THE IDENTIFICATION OF 21 AND 37 PARALLEL COMMUNITIES, RESPECTIVELY. TWO CONDITIONS ARE SITED AS HAVING SPECIAL IMPORTANCE TO THE ULTIMATE RECRUITMENT OF A SUBSTRATE THAT MUST BE MET BY THE SPECIES: 1) THERE ARE MANY BARRIERS THAT MUST BE MET BY THE PLANKTONIC LARVAE OF THE MACROBENTHOS; 2) AFTER METAMORPHOSIS AND SETTLING, SPECIES MUST PASS A NEW SET OF BARRIERS ON THE MEIOFAUNA AS WELL AS THE MACROFAUNA LEVEL AND PASS A HEAVY "SURVIVAL-OF-THE-FITTEST" FILTER, IN WHICH NOT ONLY THE TRADITIONAL PREDATORY CRAB GASTROPODS, SEA-STARS, BUT ANIMALS FROM MANY GROUPS, USUALLY REGARDED AS FULLY OR REL. HARMLESS, TAKE THEIR HEAVY TAX.

WARWICK, R.M. NO. 09
1979. POPULATION DYNAMICS AND SECONDARY PRODUCTION OF BENTHOS
IN TENORE, K. & B. COULL (EDS). MAR BEN DYNAMICS, UNIV S.C.PRESS; 1-24

THE CONTRASTING POPULATION DYNAMICS OF MACROFAUNA & MEIOFAUNA ARE
DISCUSSED IN RELATION TO THEIR REPRODUCTIVE BIOLOGY & TO THE
PROBLEMS INVOLVED IN CALCULATING THEIR PRODUCTION.

WARWICK, R.M., C.L. GEORGE AND J.R. DAVIES

1978 NO. 96

ANNUAL MACROFAUNA PRODUCTION IN A VENUS COMMUNITY
ESTUARINE COASTAL MAR SCI 7: 215-241.

A STATION REPRESENTATIVE OF THE VENUS COMMUNITY IN CARMARTHEN BAY, S WALES, HAS BEEN SAMPLED REGULARLY BETWEEN FEBRUARY 1974 & MARCH 1975 WITH A KNUDSEN SAMPLER, DAY GRAB & NATURALIST'S DREDGE ESTIMATES OF ANNUAL PRODUCTIVITY FOR THE 15 MOST IMPORTANT MACROFAUNA SPECIES IN THE COMMUNITY HAVE BEEN MADE USING THE TECHNIQUES OF COHORT GROWTH ANALYSIS; ANNUAL PRODUCTION, MEAN ANNUAL BIOMASS (G DRY WT./M²) & THE P/B RATIO FOR EACH SPECIES WERE AS FOLLOWS: PHARUS LEGUMEN; P = 16.119, B = 28.816, P/B = 0.56 SPIOPHANES BOMBIX; P = 3.345, B = 0.688, P/B = 4.86. ENSIS SILIQUA P = 1.372, B = 5.100, P/B = 0.27. NEPHTYS HOMBERGI; P = 0.935, B = 0.492, P/B = 1.190. DONAX VITTATUS; P = 0.721, B = 0.344, P/B = 2.10. MAGELONA PAPILLICORNIS; P = 0.616, B = 0.685, P/B = 0.625, P/B = 1.10. VENUS STRIATULA; P = 0.616, B = 1.496, P/B = 0.41. OPHIURA TEXTURATA; P = 0.458, B = 0.672, P/B = 0.68. TELLINA FABULA; P = 0.292, B = 0.325, P/B = 0.90. GLYCERA ALBA; P = 0.281, B = 0.291, P/B = 0.97. SIGALION MATHILDAE; P = 0.165, B = 0.376, P/B = 0.44. LUMBRINERIS LATREILLI; P = 0.120, B = 0.092, P/B = 1.30. THARYX MARIONI; P = 0.015, B = 0.018, P/B = 0.79. ASTROPECTEN IRREGULARIS P = 0.0004, B = 0.073, P/B = 0.005. ECHINOCARDIUM CORDATUM; P = 0.012, B = 5.138, P/B = -0.02. THE TOTAL ANNUAL PRODUCTION WAS 25.815 G M⁻² YEAR⁻¹ & THE MEAN BIOMASS 45.793 G M⁻², GIVING AN OVERALL P/B FOR THE COMMUNITY OF 0.56. THESE VALUES ARE DISCUSSED IN RELATION TO OTHER COMMUNITIES FOR WHICH COMPARABLE DATA ARE AVAILABLE.

WATERS, T. F.

1969 NO. 23

THE TURNOVER RATIO IN PRODUCTION ECOLOGY OF FRESHWATER
INVERTEBRATES
AM NAT 103(930): 173-185.

THE TURNOVER RATIO OF FRESHWATER BENTHIC INVERTEBRATES, EXPRESSED AS THE RATIO OF A COHORT'S PRODUCTIVE CONSTRUCTION TO THE MEAN STANDING CROP, HAS BEEN OBSERVED TO BE RELATIVELY CONSTANT, ABOUT 2.5 TO 5, WITH A MODE OF ABOUT 3.5. TURNOVER RATIOS WERE COMPUTED FROM ALLEN GROWTH-SURVIVORSHIP CURVES UNDER VARIOUS COMBINATIONS OF HYPOTHETICAL CONDITIONS TO DETERMINE THE THEORETICAL RANGE. THE EFFECTS OF VARYING CURVE SHAPE, INITIAL INDIVIDUAL WEIGHT RELATIVE TO MAXIMUM, FINAL POPULATION SIZE IN NUMBERS RELATIVE TO INITIAL POPULATION, & GROWTH PATTERN WERE TESTED WITH SEVERAL SERIES OF ALLEN CURVES. WITH MODERATE VARIATION IN THESE FACTORS AROUND THE MOST PROBABLE CONDITIONS, THE THEORETICAL TURNOVER RATIO VARIED FROM ABOUT 3 TO 4 FOR AQUATIC INSECTS, BUT IT IS PROBABLE SOMEWHAT LARGER FOR CRUSTACEANS. TURNOVER RATIOS WERE ALSO COMPUTED AS EQUAL TO INSTANTANEOUS GROWTH RATES COMPUTED OVER AN ENTIRE SINGLE LIFE CYCLE FOR SEVERAL INVERTEBRATE SPECIES. THESE WERE SIMILAR TO THOSE OBTAINED WITH THE ALLEN CURVES, ALTHOUGH ABOUT 1 UNIT LARGER ON THE AVERAGE.

WATERS, T. F.

NO. 31
SECONDARY PRODUCTION IN INLAND WATERS
SCIENTIFIC JOURNAL SERIES, MINN AGRIC EXPER STATION, NO. 9959

MEASUREMENT OF PRODUCTION IS BEING EMPLOYED AS AN INDICATOR OF THE HEALTH OF AN ECOSYSTEM. ASSESSING THE EFFECT OF ENV. POLLUTION OR OTHER DISTURBANCE. FISH PRODUCT. HAS BEEN USED SEV. TIMES TO EVALUATE SPORT FISH. MANAG. PROGRAMS FOR PURPOSES OF INCREAS. YIELD TO ANGLERS. THERE APPEARS LITTLE QUANTIFICATION OF THE RELATION BETW' N FISH-FOOD PRODUC. AND SCHOOL FISH YIELD, AT LEAST IN THE MOST RUSSIANS PLACE GT. SIGNIF. ON SUCH INVESTIGAT. NS. ACCUMULATION OF EMPIRICALLY-BASED P/B RATIOS CONTINUES, ALTHO IT'S CLEAR NOW THAT, EXCEPT IN UNUSUAL CIRCUM. THE ANN. P/B RATIO IS A FUNC. N OF VOLTTINISM AND MAY BE ASSUMED FAIRLY GD. PRECIS. PROVIDING VOLTM. IS KNOWN; FACTORS HAVING AN IMPOR. INF. LCE ON THE EST. OF SECOND. PRODUC. N INCL: 1) FIELD SAMPL. PROCED. AND THEIR REL. PS TO SAMPLES (G. ERROR 2) SYSTEM' C ERRORS E.G. SERIOUS UNDEREST. ES OF GROWTH RATES CAUSED BY CONTINUOUS HATCH. OF YOUNG AND S. ZE DIFF. L. PRED. OR L. SPACED INDIV. 3) REPRES. VE SAMPL. G. OF THE TOTAL POP. THRU TIME AND SPACE (4) ESTIMATES OF THE IMPOR. CE OF GAMETE PROD.'N AS A PROPORTION OF TOTAL PRODUC. N. IT APPEARS THAT MAXIMUM PRODUCTION RATES MAY EASILY REACH LEVELS OF 1000-2000 KG/HAYR (WET WEIGHT) FOR EACH OF ZOOPLANKTON, BENTHOS AND HERBIVOROUS FISHES; PROBABLY SEVERAL TIMES THESE LEVELS OCCUR, OR IN STREAMS WHERE THE BIOTA OCCUPYING A SMALL AQUATIC AREA MAY PROFIT FROM HIGH RATES OF ALLOCATHONOUS IMPORT FROM A RELATIVELY LARGE TERRESTRIAL AREA. ANNUAL PRODUCTION RATES FOR SECONDARY CONSUMERS (PREDATORS) HAVE BEEN ESTIMATED AT CONSIDERABLY LOWER RATES; TROPHIC LEVEL PRODUCTION EFFICIENCIES BETWEEN TROPHIC LEVELS REMAIN A FERTILE FIELD FOR RESEARCH, NECESSARILY REQUIRING QUANTITIES OF PRODUCTION DATA THAT ADMITTEDLY ARE EXPENSIVE TO ACCUMULATE, ALTHOUGH SOME HAVE ALREADY BEEN ROUGHED OUT. A FRUITFUL GOAL OF RESOURCE MANAGEMENT WOULD APPEAR TO BE TO IMPROVE THESE EFFICIENCIES, EMPLOYING PRODUCTION DATA FOR EVALUATION.

WATERS, T.F. NO. 59 LIFE HISTORY UPON THE ESTIMATION OF SECONDARY
1979 INFLUENCE OF BENTHOS LIFE HISTORY UPON THE ESTIMATION OF SECONDARY
PRODUCTION J FISH RES BOARD CAN 36: 1425-1430.

SYNCHRONY OF COHORTS IS ONE OF THE LIFE HISTORY FEATURES HAVING
MOST IMPORTANT EFFECTS UPON THE ESTIMATION OF BENTHIC SECONDARY
PRODUCTION, BECAUSE MOST METHODS DEPEND HEAVILY UPON RECOGNITION
OF DISCRETE COHORTS. THE HYNES METHOD, INTENDED TO CIRCUMVENT THE
NECESSITY OF COHORT DISTINCTION, STIL DEPENDS UPON DETERMINATION OF
OF TROPHIC LEVEL, VOLTINISM, & MAXIMUM SIZES, & LENGTH OF
AQUATIC LIFE. KNOWLEDGE OF PREFERRED HABITAT, DISTRIBUTION, &
BEHAVIOR ARE ESSENTIAL FOR ACCURATE PRODUCTION (FAIRLY CONSTANT AT
THE PRODUCTION:MEAN STANDING STOCK (P/B) RATIO APPROXIMATE
ABOUT 5 FOR COHORT P/B OF BENTHIC INVERTEBRATES) TO ACCOUNT FOR TROPHIC
PRODUCTION FROM STANDING STOCK DATA, ALSO MUST ACCOUNT FOR HISTORY
LEVEL, VOLTINISM, & LENGTH OF AQUATIC LIFE. VARIOUS LIFE HISTORY
FEATURES ARE COMPARED AS TO THEIR PROBABLE EFFECT ON PRODUCTION
ESTIMATION; IN ADDITION, THEY ARE COMPARED TO THE EFFECT OF
SAMPLING ERRORS.

WATERS, T. F. AND G.W. CRAWFORD
1973 NO. 27
ANNUAL PRODUCTION OF A STREAM MAYFLY POPULATION: A COMPARISON
OF METHODS
LIMNOL OCEANOGR 18(2): 286-296.

THE ANNUAL PRODUCTION OF THE MAYFLY *EPHEMERELLA SUBVARIA*, *SUBVARIA*, *LUXEMBURG CREEK*, MCDUNNOUGH IN A SMALL CENTRAL MINNESOTA STREAM, LUXEMBURG CREEK, WAS ESTIMATED BY FOUR METHODS: A REMOVAL-SUMMATION METHOD, THE INSTANTANEOUS GROWTH METHOD, THE ALLEN CURVE, & THE HYNES METHOD. BASIC DATA ON STANDING CROP & GROWTH RATES WERE OBTAINED FROM A SERIES OF BOTTOM SAMPLES COVERING THE LIFE CYCLE OF THE MAYFLY. THE LIFE HISTORY OF *SUBVARIA* WAS CLEAR & SIMPLE, & THE DATA WERE PARTICULARLY AMENABLE TO PRODUCTION ESTIMATION BY ALL FOUR METHODS. THE FIRST THREE YIELDED ESTIMATES OF ANNUAL PRODUCTION THAT GENERALLY AGREED, RANGING FROM 26.4 TO 28.9 GM -2. THE HYNES METHOD YIELDED AN ESTIMATE 15.2 TO 26.1% HIGHER, OR 33.3 GM -2. COHORT TURNOVER RATIOS FOR THE FIRST THREE METHODS RANGED FROM 4.2 TO 4.6 (NOT CALCULABLE FOR THE HYNES METHOD); THE ANNUAL TURNOVER RATIO FOR THE FIRST THREE METHODS RANGED FROM 5.8 TO 6.3 & WAS 7.2 FOR THE HYNES METHOD.

WEINBERG, S. NO. 61
1978. THE MINIMAL AREA PROBLEM IN INVERTEBRATE COMMUNITIES OF
MEDITERRANEAN ROCKY SUBSTRATA
MAR BIOL 49: 33-40.

DIFFERENT WAYS OF OBTAINING INFORMATION ABOUT MINIMAL AREA ARE STUDIED. THE CLASSICAL SPECIES-AREA CURVE LACKS OBJECTIVITY. A CURVES BASED ON SIMILARITY INDICES ARE OBJECTIVE; IN SO FAR THAT A CRITICAL THRESHOLD CAN BE DEFINED, WHERE ONE ADMITS THAT THE MINIMAL AREA IS REACHED. COMPARISON IS MADE BETWEEN SORENSEN'S QUANTITATIVE SIMILARITY INDEX (BASED ON PRESENCE-ABSENCE) & KULCZYNSKI'S QUANTITATIVE SIMILARITY INDEX (BASED ON NUMBERS OF INDIVIDUALS & OR PERCENT COVER) IN THE SHALLOWWATER ROCKY HABITATS STUDIED. TWO TYPES OF COMMUNITY WERE DISTINGUISHED. THE FIRST, MINIATURIZED COMMUNITIES ARE FOUND IN DARK CAVES. THEIR MINIMAL AREA IS ABOUT 4,000 CM². THE SECOND, COARSER, COMMUNITIES OCCUR ON OPEN ROCKS; EITHER HORIZONTAL, SLOPING OR VERTICAL. THEIR MINIMAL AREA IS 20,000 CM². CALCULATIONS WERE BASED MAINLY ON OCTOCORALLIA (COELENTERATA), WHICH ARE ASSUMED TO BE CHARACTERISTIC OF THE COMMUNITY AS A WHOLE.

WELSH, B. L.
1975. NO. 78
THE ROLE OF GRASS SHRIMP, PALAEMONETES PUGIO, IN A TIDAL
MARSH ECOSYSTEM
ECOLOGY VOL56, P513-530

THE GRASS SHRIMP, PALAEMONETES PUGIO, IS A DOMINANT SPECIES UNIQUELY ADAPTED TO A HIGHLY STRESSED TIDAL MARSH EMBAYMENT. MONTHLY SAMPLING OF LENGTH & DRY WEIGHT REVEALED THAT ITS LIFE CYCLE WAS A SINGLE YEAR, WITH SPawning IN MAY, JUNE & JULY & MOST RAPID GROWTH IN LATE SUMMER & FALL. MARK & RECAPTURE ESTIMATES CONDUCTED QUARTERLY & QUADRAT NET ESTIMATES CALCULATED MONTHLY INDICATED THAT SHRIMP WERE PRESENT THROUGHOUT THE YEAR & THAT DENSITIES PEAKED IN THE FALL (OVER 1.2 MILLION IN 0.01 KM² IN OCTOBER) PRODUCTION (INCLUDES DECOMPOSITION) OVER THE ANNUAL CYCLE, PREDATION (INCLUDING RESPIRATION) AVERAGED 1.1 KCAL.M⁻². DAY⁻¹. AVERAGE DAILY PRODUCTION PER SQUARE METER OF "TOTAL MATTER CONSUMMABLES" (FECAL PELLETS = 0.8 KCAL DISSOLVED ORGANIC MATTER (DOM) = 0.7 KCAL BIOMASS = 0.2 KCAL) WAS 60% OF TOTAL INGESTION (2.9 KCAL); PRODUCTION OF FECES & DOM THUS OUTWEIGHED BIOMASS PRODUCTION 15:2. MICROSCOPE STUDIES & OBSERVATIONS BY SCANNING ELECTRON MICROSCOPE REVEALED THAT SHRIMP MACERATED DETRITUS INTO A HETEROGENEOUS ASSORTMENT OF SUNEATED PARTICLES BY PLUCKING AWAY THE CELLULAR MATRIX FROM SURFACES OF LARGE DETRITAL FRAGMENTS. THIS ACTION PROVIDED CAVITIES THAT BECAME HEAVILY INFESTED BY PENNATE DIATOMS, & PARTICLES THAT BECAME SUSPENDED IN THE WATER COLUMN & POPULATED BY BACTERIA; NUTRIENT ANALYSES INDICATED THE SHRIMP EXCRETED LARGE QUANTITIES OF AMMONIA & PHOSPHATE WHICH TOGETHER WITH DOM RELEASE WAS PRESUMABLY RESPONSIBLE FOR HEAVY GROWTH OF MICROFLORA & INCREASED PROTEIN FRACTION IN BOTH FECES & LARGE & SMALL UNEATEN DETRITAL FRAGMENTS. PALAEMONETES PUGIO, WHILE SUPPORTING ITS OWN TROPHIC REQUIREMENTS, ACCELERATED BREAKDOWN OF DETRITUS, PREVENTING BLOCKAGES OR ACCUMULATIONS THAT MIGHT HAVE OCCURRED FROM PULSES OF EMERGENT GRASS & MACROALGAL DETRITUS IN THE EMBAYMENT. THIS REPACKAGING INTO FECES HETEROGENEOUS FRAGMENTS DOM, & SHRIMP BIOMASS MADE DETRITAL ENERGY AVAILABLE AT A VARIETY OF TROPHIC LEVELS. SMOOTHING OUT ORGANIC PULSES OVER TIME & SPACE, & RAISING

WHITTAKER, R. AND D. GOODMAN.
NO. 35
1979. CLASSIFYING SPECIES ACCORDING TO THEIR DEMOGRAPHIC STRATEGY. I.
POPULATION FLUCTUATIONS AND ENVIRONMENTAL HETEROGENEITY
AM NAT 113(2):185-200

THE EFFECTS OF ENVIRONMENTAL FLUCTUATION ON POPULATION GROWTH ARE MODELED AS ACTING THROUGH AN INTERACTION BETWEEN MICROHABITAT HETEROGENEITY & FLUCTUATIONS IN A REGIONAL ENVIRONMENTAL VARIABLE. THE RESULTS ARE RICHER IN BIOLOGICALLY IMPORTANT DETAIL THAN ARE THE RESULTS OF INTRODUCING A SIMPLE NOISE TERM TO MODIFY A VARIABLE IN A MODEL, SUCH AS THE LOGISTIC. IN PARTICULAR, THE VALUE OF A PARAMETER DESCRIBING THE MEAN VALUE OF A RANDOM ENVIRONMENTAL VARIABLE AFFECTS BOTH THE VARIANCE & THE SKEW OF THE FREQUENCY DISTRIBUTION OF REGIONAL CARRYING CAPACITY FOR THE SPECIES, WHICH IN TURN WILL CONTRIBUTE TO DETERMINING THE SPECIES MANNER OF POPULATION FLUCTUATION.

ACCORDINGLY, CARRYING CAPACITY ARE BROADLY CLASSIFIED

TO SKETCH THREE BASIC PATTERNS EMERGE THAT CAN BE NAMED & RELATED TO THE SELECTION CIRCUMSTANCES THAT THEY ENGENDER. THEY INVOLVE, RESPECTIVELY, SURVIVAL IN A PREDOMINANTLY UNFAVORABLE ENVIRONMENT (ADVERSITY SELECTION), UTILIZATION OF AN UNPREDICTABLE & INTERMITTENTLY FAVORABLE ENVIRONMENT (EXPLOITATION SELECTION), & COMPETITION IN A PREDOMINANTLY FAVORABLE & FULLY OCCUPIED ENVIRONMENT (SATURATION SELECTION). USING THESE PATTERNS OF FLUCTUATION IN CONJUNCTION WITH TWO MODELS OF POPULATION GROWTH, POPULATION SIMULATIONS CAN BE OBTAINED WHICH SUGGEST DEMOGRAPHIC STRATEGIES APPROPRIATE IN EACH CONTEXT. THE REGIMES ARE NOT READILY CATEGORIZABLE AS TO THE INTENSITY OF R-SELECTION VERSUS K-SELECTION, WHICH SUGGESTS THAT THE R-K CLASSIFICATION IS OVERSIMPLIFIED. THE NATURE OF THE FLUCTUATIONS IN GROWTH PARAMETERS EXPERIENCED BY A GIVEN SPECIES ARE SUFFICIENTLY SENSITIVE TO PROPERTIES OF THE SPECIES ITSELF THAT MANY DIFFERENT ADAPTIVE DEMOGRAPHIES MAY BE REPRESENTED IN A COMMUNITY OCCUPYING A SINGLE ENVIRONMENT.

WIDDOWS, J., P. FIETH AND C.M. WORRALL
NO. 04
1979
RELATIONSHIPS BETWEEN SESTON, AVAILABLE FOOD AND FEEDING ACTIVITY
IN THE COMMON MUSSEL *MYTILUS EDULIS*
MAR BIOL 50: 195-207

THE FEEDING & METABOLIC RATES OF *MYTILUS EDULIS* L. OF DIFFERENT BODY SIZES WERE MEASURED IN RESPONSE TO CHANGES IN PARTICLE CONCENTRATIONS RANGING FROM 2 TO 350 MG 1-1. RATES OF OXYGEN CONSUMPTION WERE NOT SIGNIFICANTLY AFFECTED BY CHANGES IN SESTON CONCENTRATION, WHEREAS CLEARANCE RATES GRADUALLY DECLINED WITH INCREASING PARTICLE CONCENTRATION. CONCENTRATION PRODUCTION WAS INITIATED AT RELATIVELY LOW SESTON CONCENTRATIONS (<5 MG 1-1). MARKED SEASONAL CHANGES WERE RECORDED IN THE COMPOSITION OF SUSPENDED PARTICULATES (SESTON) IN AN ESTUARY IN SOUTH-WEST ENGLAND. TOTAL SESTON WAS SAMPLED AT FREQUENT INTERVALS THROUGHOUT AN ANNUAL CYCLE & ANALYSED IN TERMS OF: PARTICLE SIZE-FREQUENCY DISTRIBUTIONS, TOTAL DRY WEIGHT (MG 1-1), INORGANIC CONTENT, CHLOROPHYLL A, CARBOHYDRATE, PROTEIN & LIPID. THE PARTICULATE CARBOHYDRATE, PROTEIN & LIPID CONTENT PROVIDED AN ESTIMATE OF THE FOOD CONTENT OF THE SESTON. THE RESULTS ARE DISCUSSED IN TERMS OF THE "FOOD AVAILABLE" TO A NONSELECTIVE SUSPENSION FEEDER, SUCH AS *M. EDULIS*, DURING A SEASONAL CYCLE. THE EFFECT OF INORGANIC SILT IN SUSPENSION WAS MAINLY TO LIMIT BY "DILUTION" THE AMOUNT OF FOOD MATERIAL FILTERED RATHER THAN TO REDUCE THE AMOUNT OF MATERIAL INGESTED BY THE MUSSEL. IN WINTER, THE FOOD CONTENT OF THE MATERIAL INGESTED WAS 5%, & THIS INCREASED TO 25% DURING THE SPRING & SUMMER.

WILLIAMS, R. AND D. ROBBINS
1979 NO. 25
CALORIFIC, ASH, CARBON AND NITROGEN CONTENT IN RELATION TO LENGTH
AND DRY WEIGHT OF *PARATHEMISTO GAUDICHAUDI* IN NE ATLANTIC OCEAN
MAR BIOL 52: 247-252.

THE CALORIFIC, ASH, CARBON & NITROGEN CONTENT, LENGTH & DRY WEIGHT
WERE DETERMINED FOR THE HYPERIID PARATHEMISTO GAUDICHAUDI
(GUERIN). REGRESSION EQUATIONS FOR ALL THESE VARIABLES WERE
DETERMINED SO THAT THEY CAN BE ESTIMATED BY CALCULATION FROM
MEASUREMENTS OF LENGTH OF THE HYPERIID. MEAN VALUES FOR TOTAL
NITROGEN & CARBON WERE $7.79 \pm 0.85\%$ & $36.80 \pm 4.18\%$ OF THE DRY
WEIGHT, RESPECTIVELY. THE CARBON TO CALORIFIC EQUIVALENT FOR P.
GAUDICHAUDI WAS $10.37 \text{ KCAL G}^{-1}$ CARBON (9.13 KCAL G^{-1} WHEN
CORRECTED FOR NITROGEN). THE CALORIFIC VALUE FOR ASH-FREE ADULT
P. *GAUDICHAUDI* WAS $51.78 \text{ KCAL G}^{-1} \pm 1.309 \text{ (4.510 KCAL G}^{-1}$
WHEN CORRECTED FOR NITROGEN). THIS LARGE VARIATION IN THE
CALORIFIC CONTENT (COEFFICIENT OF VARIATION OF 25.84%) CAN BE
ACCOUNTED FOR LARGELEY BY VARIATION IN THE ASH CONTENT (COEFFICIENT
OF VARIATION OF 21.84%). THE CALORIFIC VALUE DETERMINED FOR P.
GAUDICHAUDI IS SIMILAR TO THAT MEASURED FOR OTHER CARNIVOROUS
CRUSTACEANS & ADDS SUPPORT TO THE HYPOTHESIS THAT ANIMALS WITH
HIGH CALORIFIC CONTENT HAVE A LOW FECUNDITY & AN ENERGY-RICH
STORE WHICH CAN BE USED AS A BUFFER DURING UNFAVORABLE PERIODS
IN THEIR LIFE.

WINBERG, G.G. (ED.)
1971 NO. 29
METHODS FOR THE ESTIMATION OF PRODUCTION OF AQUATIC ANIMALS
ACADEMIC PRESS, NEW YORK. 175P.

THIS IS A COMPREHENSIVE DISCUSSION OF THE PARAMETERS IMPORTANT
IN ESTIMATIONS OF SECONDARY PRODUCTION AND METHODS FOR
ESTIMATING SECONDARY PRODUCTION.

WITHERS, R.G.

NO. 36
SOFT-SHORE MACROBENTHOS ALONG THE SOUTH-WEST COAST OF WALES
ESTUARINE COASTAL MAR SCI 5: 467-484.

THE DISTRIBUTION, ZONATION & ABUNDANCE OF SAND-DWELLING MACROFAUNA HAS BEEN EXAMINED ON 16 BEACHES BETWEEN MILFORD HAVEN & SWANSEA BAY & 116 SPECIES HAVE BEEN IDENTIFIED. RATHER GRAVELLY, COARSE TO MEDIUM SANDS DOMINATED ON THE BEACHES IN MILFORD HAVEN & AROUND THE ANGLE PENINSULA & EXCEPTING THE MUDDY SHORE AT KILPAISON (ANGLE BAY) WHERE BOTH *CARDIUM* (CERASTODERMA) EDULE (L.) & *ARENICOLA MARINA* (L.) WERE COMMON, SPECIES DIVERSITY & BIOMASS WERE GENERALLY LOW. AROUND CARMARTHEN BAY THE BEACHES WERE LARGELY COMPOSED OF WELL-SORTED MEDIUM TO FINE SANDS & DESPITE THEIR OFTEN CONSIDERABLE EXPOSURE, THEY CONTAINED A RICH & DIVERSE FAUNA. A CONSIDERABLE NUMBER OF SPECIES WERE ALSO RECORDED FOR SHELTERED SHORES ON THE SOUTH COAST OF THE GOWER PENINSULA BUT THE FAUNA OF MORE EXPOSED SHORES IN THIS REGION COMPARED UNFAVOURABLY WITH EQUIVALENT BEACHES IN CARMARTHEN BAY. OVERALL, DIVERSITY WAS GREATEST ON SHELTERED TO SEMI-EXPOSED BEACHES, COMPOSED OF FINE BUT FAIRLY CLEAN SAND. MEAN BIOMASS VALUES FOR EACH SHORE RANGED FROM 0.25 G DRY WT M⁻² TO 13.7 G DRY WT M⁻² & ALTHOUGH VALUES UP TO 25.7 G DRY WT M⁻² WERE RECORDED LOCALLY ON A NUMBER OF SHELTERED BEACHES, THIS USUALLY RESULTED FROM AN ABUNDANCE OF ONE OR TWO RELATIVELY LARGE SPECIES VERTICALLY. ZONATION WAS MOST APPARENT AMONG CRUSTACEANS, ESPECIALLY HAUSTORIID AMPHIPODS, & SOME POLYCHAETES. SETTLEMENT & GROWTH RATE DATA ARE GIVEN FOR *TELLINA TENUIS* DA COSTA, T. *FABULA GMELIN* & *ECHINOCARDIUM CORDATUM* (PENNANT).

WOLFF, W. J.

NO. 197 FOR THE GREVELINGEN ESTUARY, THE NETHERLANDS
A BENTHIC FOOD BUDGET FOR THE MECH. CAUSING HI BENT SEC. PRODUC IN ESTUARIES
AND A CONSID. OF THE MECHE. COULL, B.C. (ED). ECOL MAR BENTHOS, UNIV S. CAROLINA PRESS:267-280

AN ANNUAL FOOD BUDGET FOR THE ZOOBENTHOS OF A TIDAL ESTUARY OF
140 KM² IN THE NETHERLANDS IS CONSTRUCTED. ALTHOUGH THIS BUDGET IS
PARTLY BASED ON SEVERAL QUESTIONABLE ASSUMPTIONS, THE FOLLOWING OF
OBSERVATIONS SEEM RELIABLE. PRIMARY PRODUCTION IN SITU & IMPORT OF
ORGANIC DETRITUS FROM THE COASTAL SEA APPEARS TO BE THE MOST
IMPORTANT FOOD SOURCES: DETRITUS IMPORTED FROM SALT MARSHES OR
OTHER TERRESTRIAL SYSTEMS IS RELATIVELY UNIMPORTANT. THIS TYPE OF
FOOD BUDGET, WHICH ALSO HAS BEEN FOUND IN THE DUTCH WADDEN SEA, IS
VERY DIFFERENT FROM THE BENTHIC FOOD BUDGETS OF AMERICAN ESTUARIES
WHERE THE BENTHOS DEPEND PRIMARILY ON SALT MARSH OR MANGROVE
DETRITUS & PRIMARY PRODUCTION IN SITU. THE MECHANISMS CAUSING HIGH
BENTHIC SECONDARY PRODUCTION IN ESTUARIES ARE REVIEWED &
CATEGORIZED INTO THREE TYPES: (1) THOSE IN WHICH THE SUPPLY OF
DISSOLVED NUTRIENTS FROM VARIOUS SOURCES CAUSES HIGH PRIMARY
PRODUCTION; (2) THOSE WITH SUPPLY OF PARTICULATE ORGANIC MATTER
FROM VARIOUS SOURCES TO ESTUARINE WATERS; & (3) THOSE IN WHICH THE
SHALLOW NATURE OF THE ESTUARY CAUSES RAPID SINKING OF PARTICULATE
ORGANIC MATTER, AS WELL AS RAPID TRANSPORT OF PARTICULATE ORGANIC
MATTER BY TURBULENT DIFFUSION.

WOODIN, S.A.
1974 NO. 25
POLYCHAETE ABUNDANCE PATTERNS IN A MARINE SOFT-SEDIMENT
ENVIRONMENT: THE IMPORTANCE OF BIOLOGICAL INTERACTIONS
ECOL MONogr 44:171-187.

SAMPLES OF INFRAUNA AND MEASUREMENTS OF TEMPERATURE, OXYGEN,
SALINITY, AND ALGAL COVER WERE TAKEN FROM JANUARY 1969 TO DECEMBER
1970 AT -1.2-FT TIDAL ELEVATION IN A MUD FLAT DOMINATED BY
POLYCHAETES IN MITCHELL BAY, SAN JUAN ISLAND, WASHINGTON SETTLEMENT
MORTALITY OF ADULTS AFTER SPawning AND VARIABLE LARVAL POPULATION
SUCCESSES PROBABLY EXPLAINED MUCH OF THE VARIATION IN POPULATION
NUMBERS OF THE FOUR LARGE AND NUMERICALLY IMPORTANT POLYCHAETE
SPECIES, *LUMBRINEREIS*, *INFILATA*, *AXIOTHELLA RUBROCINCTA*, *PLATYNEREIS*
BICANALICULATA & *ARMANDIA BREVIS*. NO CORRELATIONS WERE FOUND
BETWEEN THE ABUNDANCES OF NUMERICALLY IMPORTANT SPECIES & PHYSICAL
FACTORS. EXCLOSURES CONSTRUCTED OF 3-MM MESH PLASTIC SCREENING
PLACED ON THE FLAT BECAME COVERED WITH DIATOMS SETTLING JUVE
NILES OF TUBE-BUILDING SPECIES, SUCH AS *P. BICANALICULATA*,
AXIOTHELLA RUBROCINCTA, & *L. INFILATA*, BUILT TUBES IN THIS LAYER
OF DIATOMS & THUS DID NOT REACH THE ENCLOSURE'S SEDIMENT. WHILE
SETTLING JUVENILES OF A BURROWING SPECIES, *ARMANDIA BREVIS*,
BURROWED THROUGH THE DIATOM LAYER & REACHED THE SEDIMENT. THUS,
CLEANING THE SURFACES OR REMOVING THE CAGE AFTER SETTLEMENT
REDUCED ABUNDANCES OF TUBE-BUILDING SPECIES WITHOUT DISTURBING
THE SEDIMENTS SINCE ADULTS OF ALL THREE NUMERICALLY IMPORTANT
TUBE BUILDERS EXPERIENCE MORTALITY AFTER SPAWNING. THE MANIP
ULATION OF TUBE-BUILDER ABUNDANCES SHOWED THAT THE BURROWING
SPECIES, RESPONDED TO SPACE VACATED BY TUBE BUILDERS BY INCREASED
SETTLEMENT SUCCESS. RESULTS FROM EXPERIMENTAL VARIATION OF A. BREVIS NUMBERS PER UNIT VOLUME
OF SEDIMENT IN THE LABORATORY & ABUNDANCE DATA FROM UNMANIPULATED
NATURAL AREAS ALSO DEMONSTRATED THE PRESENCE OF INTRASPECIFIC
& INTRASPECIFIC COMPETITION FOR SPACE. CHANGES IN PHYSICAL LEVELS
& FACTORS DUE TO ALGAL COVER HAD SOME IMPACT ON POPULATION LEVELS
BUT THE COMPETITIVES INTERACTIONS & BEHAVIOR PATTERNS REVEALED
ONLY BY OBSERVATIONS ON THE BEHAVIOR OF LIVING ORGANISMS &
MANIPULATION OF THE INFRAUNA, DEMONSTRATED THE IMPORTANCE OF
BIOLOGICAL INTERACTIONS TO THE DETERMINATION OF SPECIES ABUNDANCE
PATTERNS IN A SOFT-SEDIMENT ENVIRONMENT.

HOODIN, S.A.

NO. 98
1977. GARDENING BEHAVIOR BY NEREID POLYCHAETES, EFFECTS ON SOFT
ALGAL COMMUNITY STRUCTURE

MAR BIOL 44: 39-42

NEREID POLYCHAETES (NEREIS VEXILLOSA & PLATYNEREIS BICANALICULATA) ATTACH PIECES OF DRIFT ALGAE TO THEIR TUBE SURFACES. THE PRESENCE OF PERMANENT ALGAL COVER INCREASES THE PREDICTABILITY OF THE FOOD SUPPLY FOR AT LEAST THE HERBIVORES (INCLUDING THE NEREIDS) & THE DEPOSIT FEEDERS, & MODULATES THE TEMPERATURE & SALINITY STRESSES OF THE MARINE INTERTIDAL SOFT-BOTTOM ENVIRONMENT. HOWEVER, IT MAY AFFECT THE ACCESS OF ORGANISMS TO THE OXYGENATED WATER LAYERS ABOVE THE SEDIMENT SURFACE. THIS IS TRUE FOR POLYCHAETES THAT LIVE HEAD DOWNWARDS IN VERTICAL TUBES. IT IS SUGGESTED THAT THE ATTACHMENT BEHAVIOR OF THE NEREID POLYCHAETES INCREASES THE SPATIALITY OF THE PLANT TO COLONIZE HABITATS BOTH TEMPORALLY &

YOUNG, D.K. AND D.C. RHOADS
1971 NO. 39
ANIMAL-SEDIMENT RELATIONS IN CAPE COD BAY, MASSACHUSETTS I. A
TRANSECT STUDY
MAR BIOL 11: 242-254.

BENTHIC MACROFAUNA & BOTTOM SEDIMENTS WERE SAMPLED AT 7 STATIONS ALONG A 24 KM LONG ONSHORE-OFFSHORE TRANSECT RANGING IN DEPTH FROM 12 TO 42 M IN CAPE COD BAY, MASSACHUSETTS, USA. HIGH FAUNAL DIVERSITY, BIOMASS & SPECIES DIVERSITY WERE RECORDED AT STATIONS DENSELY POPULATED BY TUBICOLOUS POLYCHAETES. THESE TUBE MATS BIND & STABILIZE THE SUBSTRATE, PROVIDING SOLID SURFACES FOR ATTACHMENT OF EPIZOANS. THREE SUSPENSION-FEEDING SPECIES, EUCHONE INCOLOR (POLYCHAETE) THYSIRAGOULDII (BIVALVE) & AEGININA LONGIFORMIS (AMPHIPOD), CO-OCCUR WITH DEPOSIT-FEEDING SPECIES ON MUDS RESUSPENDED BY TIDAL CURRENTS. HYDROGRAPHIC PROFILES OF TEMPERATURE, SALINITY & TURBIDITY INDICATE THAT RESUSPENDED SILT-CLAY PARTICLES ARE ENTRAPPED IN DENSE WATER BELOW THE SUMMER THERMOCLINE, WHICH PERSISTS FROM MID-APRIL TO MID-OCTOBER. THE ZONE OF INTERSECTION OF THE THERMOCLINE WITH THE SEA FLOOR IS ABOUT 22 M OF WATER DEPTHS. A MAJOR BIOFACIES-LITHOFACIES TRANSITION. THIS OCOTONE IS CHARACTERIZED BY HIGH FAUNAL DENSITY, BIOMASS, & SPECIES DIVERSITY. BENTHIC POPULATIONS OF MACROFAUNA FROM CAPE COD BAY ARE LARGER THAN THOSE FROM BUZZARDS BAY, MASSACHUSETTS, & HAVE A WIDELY DIFFERENT TAXONOMIC & TROPHIC COMPOSITION.

YOUNG, D.K. AND M.W. YOUNG
1978 NO. 66
REGULATION OF SPECIES DENSITY OF SEAGRASS-ASSOCIATED MACROBENTHOS:
EVIDENCE FROM FIELD EXPERIMENTS IN THE INDIAN RIVER ESTUARY, FLA.
J. MAR. RES. 36(4): 569-593.

IN ORDER TO PROVIDE INSIGHT INTO THE REGULATION OF SPECIES DENSITIES OF SEAGRASS-ASSOCIATED MACROBENTHOS, FIELD EXPERIMENTS IN THE INDIAN RIVER ESTUARY, FLORIDA WERE INITIATED IN THE SEAGRASS HALODUNE WRIGHT TO TEST EFFECTS OF (1) EXCLUDING PREDATORS BY CAGING, (2) ENCLOSING PREDATORS INSIDE CAGES, (3) ADDING DENSE POPULATIONS OF SUSPENSION FEEDERS, (4) PROVIDING ORGANIC ENRICHMENT, (5) REMOVING SEAGRASS BLADES, & (6) ERECTING CAGES AT DIFFERENT TIMES. THE 11 MOST ABUNDANT SPECIES WERE SELECTED FOR STATISTICAL TESTING OF RESPONSES TO THESE EXPERIMENTAL TREATMENTS. ANALYSES SHOWED THAT MACROBENTHIC SPECIES DIFFERED MARKEDLY IN THEIR RESPONSES TO THE VARIOUS TREATMENTS OVER A PERIOD OF ONE YEAR. SEVERAL SPECIES HAD INCREASED DENSITIES WITH ORGANIC ENRICHMENT & ONE INCREASED DEPENDING ON THE TIME WHEN A CAGE WAS ERECTED. SOME SPECIES HAD INCREASED DENSITIES WHEN SEAGRASS BLADES WERE CLIPPED WHILE OTHERS SHOWED DECREASED DENSITIES WHEN BLADES WERE REMOVED. CERTAIN SPECIES OCCURRED IN HIGH DENSITIES ONLY INSIDE PREDATOR EXCLUSION CAGES. THESE VARIATIONS IN RESPONSE DID NOT CONSISTENTLY CORRESPOND TO TAXONOMIC GROUPINGS OR FEEDING TYPES. THESE FIELD EXPERIMENTS MAY ENCOURAGE CAUTION BY MARINE ECOLOGISTS WISHING TO GENERALIZE FROM ONE SPECIES OR GROUP OF SPECIES TO THE COMMUNITY LEVEL OF ORGANIZATION.

YOUNG, P.C. AND V.A. WADLEY
1979 NO. 72
DISTRIBUTION OF SHALLOW-WATER EPIBENTHIC MACROFAUNA IN MORETON
BAY, QUEENSLAND, AUSTRALIA
MAR. BIOL. 53: 83-97.

THE DISTRIBUTION OF EPIBENTHIC PENAEID PRAWN POSTLARVAE HAS PREVIOUSLY BEEN SHOWN TO RELATE TO THE DEGREE OF MARINE INFLUENCES IN THE FLORA, SEDIMENT & WATER CONDITIONS IN LITTORAL & INFRALITTORAL HABITATS IN MORETON BAY. THE POSTLARVAE ARE PART OF A COMPLEX FAUNAL ASSEMBLAGE OF APPROXIMATELY 400 MOBILE EPIBENTHIC SPECIES; SAMPLES OF THE ASSEMBLAGE FROM STATIONS SITUATED THROUGHOUT MORETON BAY WERE ANALYSED BY MULTIVARIABLE METHODS, TO DETECT WHETHER THE ENVIRONMENTAL INFLUENCES RELATED TO THE DISTRIBUTION OF PENAEID PRAWNS, WERE RELATED TO THE FAUNA AS A WHOLE. THIS WAS FOUND TO BE SO. THE FAUNA OCCURRED IN TWO GROUPS IN AREAS OF EITHER LESS MARINE OR MORE MARINE INFLUENCES: ANIMALS IN THE FIRST GROUP WERE LESS DIVERSE, WITH DISTRIBUTIONS UNRELATED TO DEPTH OR PRESENCE OF SEAGRASSES, BUT RELATED TO THE LEVEL OF MARINE INFLUENCES BETWEEN GEOGRAPHICAL AREAS SAMPLED. ANIMALS IN THE SECOND GROUP WERE CLOSELY RELATED TO DEPTH & PRESENCE OF SEAGRASSES, BUT NO OVERALL DIFFERENCES WERE ATTRIBUTABLE TO MARINE INFLUENCES APART FROM THOSE ATTRIBUTABLE TO DEPTH. TEMPORAL CHANGES IN SPECIES COMPOSITION WERE SMALLER THAN SPATIAL CHANGES, & CHANGES IN RELATIVE ABUNDANCE WERE, IN BOTH GROUPS, RELATED TO DIFFERENCES BETWEEN (I) SUMMER & WINTER, & (II) SPRING & THE REST OF THE YEAR.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Lunz, John D.

Animal substrate relationships and productivity of invertebrate macrobenthos of Mississippi Sound and adjacent coastal areas; a bibliography with abstracts / by John D. Lunz, Harry L. Horstmann (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1981.

143 p. ; 27 cm. -- (Miscellaneous paper ; EL-81-12)

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1. Coastal ecology. 2. Fishes. 3. Invertebrates.
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II. United States. Army. Corps of Engineers. Mobile
District. III. U.S. Army Engineer Waterways Experiment
Station. Environmental Laboratory. IV. Title V. Series:

Lunz, John D.

Animal substrate relationships and productivity : ... 1981.
(Card 2)

Miscellaneous paper (U.S. Army Engineer Waterways
Experiment Station) ; EL-81-12.
TA7.W34m no.EL-81-12